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INTRODUCTION

This final number of the first volume of our Review contains the proceedings of our Chicago Conference, held September 15-16, 1911. The meeting brought together about two hundred experts, more than fifty of whom were government officials, from the most widely separated parts of the United States and Canada. The three main topics discussed were: (1) the scientific prevention of industrial accidents; (2) the uniform reporting of industrial injuries; and (3) the administration of labor laws through State Commissions.

The enactment in ten states of workmen's compensation or accident insurance laws has demonstrated that scientific work is no longer merely desirable. It is necessary. Publicity of conditions which are unjust has led naturally enough to legislation as a means of righting obvious wrongs. Moreover, the added cost of indemnifying all instead of only a few of the injured has brought to the problem of accident prevention the service of experts. And real experts demand the facts. They require (1) intelligent and uniform reporting of industrial injuries; they insist upon (2) just and practicable systems of compensation or insurance; and above all they demand (3) safe-guards and laws which will actually prevent industrial injuries. For the greatest of these is prevention.

JOHN B. ANDREWS, Secretary,
American Association for Labor Legislation.

I

STANDARDIZATION FOR ACCIDENT PREVENTION

Friday Afternoon Session, September 15, 1911.

Presiding Officer: Henry R. Seager
President, American Association for Labor Legislation.
Metropolitan Tower, New York City.

INTRODUCTORY ADDRESS

HENRY R. SEAGER

The American Association for Labor Legislation, which has invited you to this Conference, was organized six years ago to promote the enactment and enforcement of wise labor laws in the United States. To welcome you here by saying that in consequence of our efforts only wise laws are now being enacted and that they are rigidly enforced, would be to exaggerate! I may truthfully assert, however, that each year that we have been in existence has seen more and better labor laws passed by American legislatures and greater attention given to their enforcement. This progress, has been due more to the spirit of the times in which we live than to any single agency. But the spirit of the times is vague and diffused over a wide area. In the work of bringing it to a focus and causing it to take form in practical labor legislation this Association has been a recognized leader.

The circulation in English of the Bulletins of the International Labour Office, our own publications and especially the American Labor Legislation Review, Dr. Andrews' monthly department in the Survey, the meetings and conferences that we have held, and last, but by no means least, the never ending stream of answers to questions that goes out from our office in the Metropolitan Tower to every part of the country, have brought accurate, up-to-date information to hundreds and thousands of persons in public and private life, who in turn have put it to practical use in legislation or administration.

Dr. Andrews declares that this Association first became a live wire with the National Conference on Industrial Diseases which we held here in Chicago some fifteen months ago. But he was not an entirely impartial judge of that occasion. He had just been through the ordeal of shifting our headquarters from hospitable Madison to cold, self-absorbed New York and was so glad to get back here among his own people that he saw everything through rose-colored glasses. There is no doubt, however, that the Conference was the most stimulating and successful we had held up to that time. As I like to think that many of you were there and that that is one of the reasons why you have come again to-day, I may make some of the events that have happened since in the labor legislation world the text for my introductory remarks.

We are to discuss this afternoon methods of accident prevention. One of the methods in which I have great confidence is to impose the cost of indemnifying injured wage-earners squarely and directly on the employer. More often than not he is not to blame for the accident. Nevertheless he is the one we must look to, on the one hand, to devise all possible means, mechanical and personal, for preventing accidents, and on the other, to pass along the expense of compensating the accidents that cannot be prevented, to consumers who ought to bear this along with the other expenses of production. The undoubted fact that most of the avoidable accidents that occur are due to the injured workers themselves or their fellow employes is no argument against this view. Humane employers have demonstrated hundreds of ways in which careless employes may be taught to be more careful of one another's lives and limbs just as they are taught to be more careful of the employer's plant and materials. But unfortunately humane employers are exceptional. This is not because most employers are not humane men. I believe that they are in their private lives. But *as* employers their primary interest is to make money, and this so fully absorbs their time and energy that they can have little thought for anything else. We must make our law such that *one way in which the employer may make money is by making the working conditions of his plant safer.* Where this is the case, as German experience proves, all employers, whether naturally humane or not, will be eager co-workers with accident inspectors in protecting their men from injury. For this reason our discussion of methods of accident prevention may well include some word about the progress that is being made in workmen's accident compensation and insurance legislation.

The most important labor legislation that has been enacted in the United States since our last conference has been in this related field. Last year we were discussing the form that provision for the victims of industrial accidents ought to take. This year one of our round table conferences is devoted to the administration of compensation and insurance acts. Thus are we moving from the doubtful arena of projected legislation to the secure field of practical administration! Since last year ten states (California, Illinois, Kansas, New Hampshire, New Jersey, Massachusetts, Nevada, Ohio, Washington and Wisconsin) have passed accident compensation or insurance laws. Adding to these the laws previously passed by New York, Maryland and Montana we have thirteen states that have signified their resolution to discard the discredited employers' liability law and substitute some better system. Of these new laws, the compulsory compensation law of New York has been declared unconstitutional. Its elective compensation law has not been attacked, however, so it still belongs among the states that have broken away from the old system. An analysis of the thirteen laws that are now in operation or about to go into operation is instructive. All but three of them, the compulsory insurance laws of Maryland, Montana and Washington, applying in the first two states only to coal mining and in the third to extra-hazardous industries, are elective.[1] All of the elective laws, however, except those of New York and Nevada, put special pressure on employers to induce them to accept the new system by penalizing them for failure to do so by abrogating or modifying their common law defenses in industrial accident cases. The decided trend of legislation has been, therefore, toward evading the constitutional obstacle which the New York Court of Appeals opposed to compulsory compensation legislation, rather than toward removing it either by constitutional amendment or by getting a different ruling from other courts of equal authority. This course has had the advantage of leading to immediate results but in New York we have felt that it would be better in the end to remove the constitutional obstacle for all time through an amendment. There is the more reason for this view because already in the state nearest to us, New Jersey, the abrogation of the fellow-servant and assumption of risk defenses has as yet proved insufficient to induce one of the largest employing corporations in the state, the Standard Oil Company, to accept the compensation system. Other large employers may take the same position, and it is certain that the rates of compensation must not only begin but remain low to induce any considerable number, voluntarily, to substitute liability to compensate all injured employes, for the restricted liability of a negligence law.

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[1] In Wisconsin and probably in California, where the wording of the law is ambiguous, compensation is compulsory as regards employes of the state and municipalities.

One of the few disappointing aspects of the legislative activity of the year has been the failure of even a single state to follow New York in attempting to make the compensation system compulsory. The decision of the New York Court of Appeals has called forth protests and criticisms from able constitutional lawyers all over the country and in the interest of progressive labor legislation it would, it seems to me, be a grave mistake to accept its rigid, illiberal interpretation of the due process clause as final.

Most of the states that have legislated thus far have chosen some system of compensation modelled after that of the United Kingdom as best suited to American conditions. Five states, however, Maryland, Montana, Washington, Ohio and Massachusetts, have preferred systems of state insurance. Maryland, Montana and Washington have gone so far as to make such insurance compulsory for certain designated industries, so we may soon expect rulings from the courts as to the constitutionality of this method of solving the problem.[1] That the plan adopted by Massachusetts under which the choice of the insurance system is voluntary, but made attractive to the employer by the abrogation of the common law defenses of those who do not accept it, is constitutional in that state was declared by the Supreme Court in answer to a legislative inquiry before the law was passed.

Almost as remarkable as this legislative accomplishment has been the appointment of commissions to study the problem in states that have not yet acted. In addition to the federal commission there are at present nearly a dozen commissions or committees studying it for different state legislatures.

The results in this department to the credit of 1911 are thus memorable from many points of view. Three different systems of providing for the victims of industrial accidents have been put on trial: elective compensation, elective state insurance and compulsory state insurance. Notwithstanding this variety of methods the scales of compensation, and therefore presumably the burdens imposed on employers, are substantially the same in the different states that have legislated. Finally, the strong probability of furth-

[1] Since this address was delivered the Supreme Court of Washington has unanimously upheld the Compulsory Accident Insurance Law of that state in the case of State of Washington *v.* Clausen, decided Spetember 27, 1911. The Wisconsin law is upheld in the case of Borgnis et al., v. The Falk Company, November 14, 1911.

er federal and state legislation in 1912 is attested by the appointment of numerous commissions of inquiry. A few more years of such progress will bring us abreast of the best legislation of Europe in this field.

Imposing upon the employer and through him upon consumers the expense of compensating on a reasonable scale the victims of accidents, is one part of the work of prevention, but only a subordinate part. The toll of lives and limbs which our industries levy each year is so huge that the task of preventing accidents must be attacked directly and with all the vigor and intelligence that we can bring to bear upon it. We are fortunate in having as the first speaker on our program this afternoon a gentleman who has enjoyed rare opportunities to study methods of accident prevention, first as a factory inspector in Scotland and later as manager of a widely diversified manufacturing plant. It gives me great pleasure to introduce Mr. John Calder, General Manager of the Remington Typewriter Works, who will speak on "Scientific Accident Prevention".

SCIENTIFIC ACCIDENT PREVENTION

JOHN CALDER
General Manager, Remington Typewriter Works.

The industrial tragedies of the forest, the field, the street, the factory and the mine for a long time weighed very lightly upon the American conscience. Employers, employes and the general body of our citizens were little concerned in preventing loss of life and limb during our great industrial development and were chiefly occupied in controversy over their surrender value.

To-day the majority of employers in all industries are concerned to avoid accidents to workers, and employes also have begun to realize that the emphasis should be laid on prevention. Preventive efforts covering the wide field of industrial arts must be thoroughly organized and systematized if they are to attain efficiency and the present paper is devoted to indicating in some detail defects in our present safety laws, their administration, and observance, which interfere with safeguarding progress by scientific methods.

As a result of some twenty-five years engineering experience in plants the writer has become convinced of the comparative futility of legislative, administrative and individual efforts after industrial safety which do not invite and secure at every stage the coöperation of the trained mechanical engineer upon whom a large part of our modern civilization depends.

From the point of view of the engineer, scientific accident prevention demands, as far as possible, uniform state safety laws, scientific administration of the laws, comprehensive specification of the risks to be covered, and statutory obligations to safeguard lying wholly upon the makers and users of machinery and dangerous apparatus. These requirements are discussed here under the head of:

LAW
ADMINISTRATION
THE EMPLOYER
THE ENGINEER

Owing to the limits assigned to this paper it is necessarily confined to scientific methods for preventing accidents from dangerous machinery alone. Those from lack of supervision, of instruction and of safe-working regulations can only receive brief mention.

LAW

(1) *The Obligation to Safeguard:*

In the older industrial countries it was realized from the first that the practical success of labor laws and particularly of their safety provisions depended upon the legal obligation to safeguard being initially and at all times upon the employer and never upon the factory inspector. This course was followed with excellent results with regard to the absolute protection of the primary machinery mentioned in the earlier statutes. An obligation of the same nature was laid upon every employer when all the mechanical risks classified generally as "dangerous machinery" came, at a much later date under the safety statutes.

In neither case was any previous notice from an inspector necessary to create an obligation on the part of the employers, the latter's responsibility beginning from the moment any dangerous machinery was set to work.

In the United States a very different condition of things exists in most sections. Legislatures and framers of safety laws have lacked either courage or insight in this matter. In some states practically no provision has been made. In others the existing safety clauses, copied with more or less fidelity from older statutes, have left the employers' obligation to fulfill the law almost wholly to the discretion and initiative of a small number of factory inspectors; the one outstanding exception being the law of 1909 of the State of Illinois.

The practical effect of our imperfect safety laws is that, for the obligation to safeguard from the first which should lie upon the employer and the employer alone, there has been substituted merely the *chance* that protection at a dangerous place may be requested at the one brief visit, in a year or so, of a stranger to the plant who has many other duties to fulfil. The distinction between the employer's obligations in these contrasted safety statutes is vital. It affects the whole result in reducing the rate of safeguarding progress in many cases to the pace of a few inspectors and partly accounts for our unenviable distinction at the head of wasters of life and limb.

Scientific accident prevention demands that the obligation under the law to safeguard should be wholly removed to the user and maker of dangerous machinery.

(2) *The Specification of Safeguarding:*

Having failed in general to place the obligation to safeguard where it belongs, we have also failed to make the specification of safeguarding sufficiently comprehensive and practical for satisfactory administration and to keep it in conformity with modern engineering progress.

Consider for a moment the origin of the safety clauses which have been copied more or less freely from the older statutes of other countries. The earlier factory acts were passed while the only available prime-movers were slow water-wheels and cumbrous types of steam engines, both requiring powerful gearing for speeding up to industrial requirements. The absolute safeguarding of the earlier acts was restricted to such elements and to hoists.

Mechanical engineering has since developed at a much greater pace than our safety laws. The distribution and sale of electrical power on a large scale has dispensed entirely with the prime-mover and its millgearing in many plants, and in others the power generators are much safer and externally simpler and relatively few injuries are now received from them.

On the other hand the great bulk of the industrial casualties inflicted by mechanical power occur to employes engaged at an immense number of dangerous machines whose risks are barely recognized in some of our safety statutes and whose protection is usually not obligatory under any of our laws until an inspector requests it and is fully prepared to demonstrate its possibility.

It is obvious that if employers took their stand to-day solely upon the statutory provisions very slow progress would be made in any state under much of our present safety law. As a matter of fact such an interest has been awakened in the last year or two amongst the larger employers in particular that their safety practice in many respects far exceeds the legal requirements. It is not desirable that the law should fall behind public opinion and the best practice and it should be amended in this direction.

(3) *The Analysis of Dangerous Elements:*

Any attempt to frame an inclusive safety law is at once confronted with technical difficulties.

Leaving on one side the comparatively simple clauses necessary to cover the accident risks from prime-movers, elevators, vats and pans, stationary equipment and lack of safety regulations, it is obviously impossible to completely and consistently schedule in any statute all the forms of machinery, daily being added to, which are "dangerous". Neither is it possible to describe satisfactorily in any statute adequate safeguarding for every condition of use of the wide range of dangerous mechanical appliances used in the arts.

The English law still calls upon the employer, and the employer alone, to safeguard "all dangerous parts of machinery" but there is no definition of "dangerous", afforded for his guidance or for that of the court should the inspector feel it necessary to press the matter of safety, and the practicability of guarding is not in dispute as well.

While legislatures have hesitated and factory departments have felt hampered by the existing law, not a few employers have gone right on accomplishing many of these debated tasks. It seems to the writer that the time is ripe for American safety legislation to lead instead of follow and that something practical can be accomplished.

It is suggested that, instead of attempting to catalogue and classify the dangerous machines themselves, we confine our attention to the practical issue, carefully analyze industrial accidents as to cause and ascertain what portions of such machines actually inflict injuries. We will find the problem much simplified thereby.

The elements common to all "dangerous machinery" and which, if unguarded or of unsafe form, are found to inflict injuries when within the reach of any worker will be found to be chiefly as follows and should be scheduled in the safety statutes:—

(a) The intaking sides of all engaging toothed or other gears, rolls, drums and slides of every description on any machine.

(b) The space between fixed and moving parts at any machine, or between the latter and structures near it, leaving insufficient working clearance for any person employed thereon, or near it.

(c) Pulleys and clutches.

(d) Belts, bands and driving chains.

(e) Flywheels.

(f) Shafts and spindles and projections thereon or upon reciprocating parts.

(g) Counterweights and balance weights.

(h) The actual operating element on a machine, such as circular saws, the punch and die in the press, the revolving cutter in the milling machine, etc.

Of these elements, (h) is by far the most dangerous and the most difficult to safeguard and the illustrations accompanying this paper are confined to the scientific treatment of this problem.

Scientific accident prevention demands that the employer be called upon by the statute to guard all dangerous machinery, and the scheduled elements in particular, unless they are of such form or in such position as to be equally safe as if guarded.

(4) *Additional Powers for State Departments:*

Under any scientific program of prevention the state factory department should be given powers to add from time to time to the schedule of specific dangerous machine elements needing to be safeguarded and in the case of dangerous processes, mechanical or otherwise, they should be empowered to frame Special Rules for conducting them in safety.

Much safeguarding can be and is already furnished most economically and efficiently by the engineers who make machinery. The state department should be empowered, without releasing the employer from his obligation, to proceed against any manufacturer of machinery or apparatus who offers such for sale with any of the dangerous elements specified in the statutory schedule unguarded and not in such position or of such form as to be equally safe as if guarded.

Textile machinery, to mention only one instance, can still be made in this country or imported into it in an unguarded and unsafe state which would secure its certain rejection under the labor statutes in Russia, and European machinery manufacturers have to take extra safety precautions to make their product saleable there.

ADMINISTRATION

(1) *Inadequate Inspection Staffs:*

Failure to lay by statute the initial obligation to safeguard on the user and the maker of dangerous machinery and to afford some comprehensive and practically useful idea of the dangerous elements has been accompanied in nearly every state by most inadequate provision for administration with results which are well known.

Our factory departments have performed for a number of years with varying degrees of efficiency certain statutory duties but the relatively few inspectors have chosen as a rule, or been forced by circumstances to concentrate their attention on functions chiefly of a policing nature concerning the hours of labor of females and minors and the structural and sanitary conditions of work places.

(2) *Absence of Engineering Experts:*

Though we are not without notable individual instances of zealous and efficient factory inspectors, first class technical and mechanical engineering ability which employers and their plant superintendents can respect and which is competent to discuss difficult safeguarding problems authoritatively has been largely absent and rarely sought.

It is an open secret that, even with superior safety laws, the success in Europe has been largely due to the tact, executive experience in plants and high intelligence, of the safety inspectors. Our state initiative in the matter of safety in the relatively few cases where it is pushed to a legal conclusion, is sometimes exercised with a timidity and lack of technical ability which makes an unfortunate impression upon the courts and employers. These conditions are not the fault of our hard working labor commissioners but spring from the system under which the legislatures and their political superiors compel some of them to work.

(3) *Need for Scientific Administration:*

The disproportion between the business laid upon these departments by numerous statutes and the appropriations and staff arrangements is very great and at present precludes much scientific progress in accident prevention. It is not necessary that all the inspectors should be safety experts or that they should be ubiquitous.

With the obligation to safeguard placed upon the proper shoulders a moderate policing force will suffice, but every factory department should have in addition several mechanical engineers, experts in matters of safety, and paid not less than $2500 a year. These, under a scientific system, should devote all their time to promoting industrial safety, by visiting plants solely for that purpose, conducting special investigations of accidents, preparing and issuing bulletins to employers illustrating effective safeguards, training ordinary inspectors in safety work and coöperating with machinery makers, casualty insurance inspectors, plant safety committees and professional engineers in securing standards of safety for all apparatus in general use.

Such standards will be progressive. They should have the force of law but need not be embodied in any statute. In any case if in successful operation, they will serve equally well in disputed cases to convince the courts that the safeguarding required by the statute is practicable.[1]

The members of factory inspection staffs, carefully recruited, should not be appointed or removed by any individual at will and the position should only be withdrawn by a state department for proved inefficiency or on an age limit; an active temperament is essential, as vigor and physical alertness are important factors in inspecting properly the less obvious accident risks of many plants.

(4) *The Use of Safety Museums:*

A properly organized Safety Museum in each state under the care of a competent mechanical engineer would be the natural result of expert safety work by the factory inspection department and the accumulation of valuable models and records. Such a museum should not solicit or accept theoretical devices for safeguarding. Unlike the ordinary museum it should not contain anything obsolete and should admit nothing the reliability of which has not been thoroughly tested out in the plants which, it should never be forgotten, are after all the true laboratories of the safety engineer.

(5) *Scientific Collection, Analysis and Interpretation of Accident Reports:*

The chief part of the state safety experts' attention should be given not to theories about accident prevention but to what is actually happening in the plants and to drawing the proper inferences therefrom. Such a study must be based on the facts and at the present time our accident statistics are of little value. It is well known that many injuries remain unreported and that the present statutory forms of report fail to distinguish sufficiently between trivial and serious occurrences and to properly describe the manner in which injury was inflicted. As a mass our recorded information on accidents is at present the despair of our best statisticians seeking light upon American conditions.

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[1] See "Scientific standards in Labor Legislation", American Labor Legislation Review, Vol. I, No. 2.

THE EMPLOYER

The subject of the employer has been treated so fully by the writer in a published paper which has had considerable circulation that only a brief reference will be made here to the employer's part in scientific prevention.

(1) *Education in Industrial Risks:*

It is in the plants themselves and in the capacity of responsible administrators that employers, their mechanical engineers and foremen are doing the most hopeful preventive work to-day. This is chiefly in the larger plants, however, and due to the greater intelligence of the executives and more liberal attitude of the employers.

It must not be forgotten that many of our most serious casualty reports come in singly from the smaller or remoter plants not yet affected by the new movement and that these less intelligent and less sympathetic employers constitute one of the factory inspector's greatest problems. They cannot see him oftener than once a year and they have to depend for safety instruction upon what they can pick up and upon the casualty insurance inspection, a service which has been greatly improved and is steadily rising in public esteem.

It has already been indicated that the limited instruction which the state can provide should be of the very best and this should be supplemented by the regular instruction, by plant engineers, of the foremen, supervisors and operatives in the accident risks of their employment. The higher executives and machinery designers should invariably receive such instruction at trade schools and colleges just as they are taught there the importance of economizing our natural resources in other directions.

The Safety Committee on which workmen have the largest representation and the personel of which is periodically changing is an excellent aid for *locating* accident risks in plants, but for scientific *prevention* it will be found necessary to make the engineers strictly responsible for the systematic provision of adequate safeguarding both in designing apparatus and after installing the same.

THE ENGINEER

(1) *The Study of Accident Risks:*

The prevention of accidents has been briefly reviewed in respect to the framing of satisfactory legislation, its adequate administration and effective compliance by employers and workers. The responsibility for such compliance in most cases devolves in the end upon the mechanical engineer either as manager, master mechanic, or superintendent.

The safety engineering of manufacturing plants calls not only for outlays of money but also for the devotion to it of valuable time and organized observation. It should not be left to the haphazard initiative of a number of individuals. Good safeguarding does not progress far by imitation alone. It must be developed methodically like all the other plant processes. The provider of it must first make a painstaking study of the actual conditions under which the employes in any one plant perform each dangerous task.

These under expert scrutiny sometimes prove to be very different from the prescribed or supposed conditions and are rarely precisely alike for the same machine in any two industries. The facts being ascertained beyond a doubt, the mechanical engineer has only to apply to the problem the trained faculties which he exercises daily in other directions and in most cases he will be able to frame standardized safety devices and safe-working precautions which can be readily adapted where necessary to the new requirements in the plants which are always presenting themselves.

(2) *Analysis of Risks at Circular Saws:*

The present paper is concluded with five out of a large number of practical examples of safeguarding in the Remington Typewriter Works, Ilion, N. Y. One of the most common and most dangerous machines—the circular saw—has been selected for an analysis of its accident risks. The use of this tool unguarded is annually responsible for some lives and a great many serious and incapacitating mutilations of the hands.

A careful review of saw accident reports and investigation of many such occurrences on the spot has convinced the writer that the guarding of a circular saw which is efficient as well as safe may have to fulfill most of the following seven conditions:—

(a) The safeguarding must be strongly made and once adjusted should be able to retain its position and form without special care on the part of the saw operator.

(b) The driving pulleys and belting of the saw bench should be securely protected and the starting and stopping gear should be positive in its action.

(c) The saw itself should be securely guarded on top, in front, behind, at the sides and beneath the bench.

(d) The guards should include a device to prevent all risk of the violent projection of the work through the latter catching or closing on the rear of a ripping saw.

(e) The saw guard should be so designed as not to obstruct the workman's view of the saw cut.

(f) The foothold around the saw bench should be secure at all times and the floor free from obstructions.

(g) The atmosphere about the saw should be kept clear by the automatic removal of all dust and chips generated.

Now, it is not practicable to fulfil all of these conditions on every form of saw, ranging from the rough logging bench in a remote lumber camp to the numerous converting and trimming saws in well appointed factories, but it is possible to safeguard all saws to a much greater extent than is generally attempted and to protect some forms in every respect without hindrance or annoyance to the operator. The latter stipulation is important for the ignoring of it often means the discarding of the guard at the earliest opportunity.

(3) *Solutions of Specific Safeguarding Problems:*

The fulfilment of the above seven conditions and of others imposed by the nature of the work is illustrated in the five diagrams exhibited herewith which are solutions of an equal number of practical safeguarding problems as follows:—

Diagram No. 1

Problem:—Safeguard a bench ripping saw 14″ diameter in a box factory, handling work ½″ to 2″ in thickness. All of the seven conditions of absolute safety to be fulfilled and in addition no part of the guards or their attachments are to obstruct the movement of lumber across any part of the fixed table other than the saw gap. Neither is any attachment for a guard permissible anywhere above the saw.

Diagram No. 2

Problem:—Safeguard a cross-cutting swing saw 20″ diameter maximum thickness of lumber 3″; all of the seven conditions of absolute safety to be fulfilled.

Diagram No. 3

Problem:—Safeguard a box-trimming saw bench with two sliding feed tables of 29″ stroke and three 16″ diameter saws on one spindle. Two of the saws are ripping and cross-cutting respectively and overhung on the ends of the spindle. The third saw, a ripping one, must locate along with its guard anywhere within a distance of 18″ along the spindle to suit variations in the size of the boxes handled. All of the seven conditions of absolute safety to be fulfilled.

Accidents from milling cutters and punch and die are too numerous and the two final examples show certain types of such machines protected so that they can be safely operated, even by females.

Diagram No. 4

Problem:—Safeguard a bench milling machine, operated by females, which has a diameter of milling cutter not exceeding 4″. Hood of guard to permit of observation of cut taken to tilt out of the way when required without detachment and to re-locate easily to suit a variation of 6″ in the position of the cutter on the arbor.

Diagram No. 5

Problem:—Safeguard a bench power press operated by females so that no accident can happen to the worker from contact with any moving part or in performing any necessary movement.

Solution:

(1) Flywheel and belt securely guarded with mesh screen to maintain good light and visibility. Guard only accessible to tool adjuster with key to same.

(2) Operator guarded by fixed opaque screen from touching crank with head or hair and from oil splash.

(3) Operator provided with push slide feed to insert work in safety.

(4) Work removed automatically for operator after each stroke of press by a cam-actuated air blast.

PRACTICABLE SAFEGUARDS
AND MEANS OF PREVENTING INDUSTRIAL ACCIDENTS

ROBERT J. YOUNG

Secretary, Committee of Safety, Illinois Steel Company.

The desirability of preventing industrial accidents is receiving a great deal of deserved attention. Much has been written on the necessity of this work—comparing the number of people maimed and fatally injured in industrial peace with the number of those killed in the wars of nations. It is the purpose of this paper, as the caption would indicate, to point out precautions and devices which, in actual experience, are accomplishing desired results.

Among the subsidiary companies of the United States Steel Corporation, the one which has probably been the pioneer in accident prevention is the Illinois Steel Company, of whose safety work it is my purpose to speak to-day.

For a number of years the subsidiary companies of the United States Steel Corporation have been carrying on a campaign for the safe-guarding of machinery and other dangerous places. In the month of May, 1906, Mr. Charles MacVeagh, General Solicitor of the United States Steel Corporation, called a meeting of the casualty managers of the subsidiary companies, to be held at his office, for the purpose of considering ways and means of preventing accidents and making working conditions safer. Two days were devoted to this discussion. In May, 1908, Mr. MacVeagh again called a meeting of the casualty managers for the purpose of considering the results of the attempts which had already been made to prevent accidents, and to consider and formulate further plans for the safeguarding of employes.

One of the results of this meeting was the appointment of a Committee of Safety. Inasmuch as this was, so far as I know, an entirely new thought, it may be well to give a short description of the work of this committee: The committee is composed of the General Solicitor of the United States Steel Corporation, Mr. Charles MacVeagh, who acts as chairman; a safety engineer having general supervision over safety matters in the corporation, Mr. C.

L. Close, who acts as secretary; and seven members, each one being a representative of some one of the subsidiary companies of the U. S. Steel Corporation, and engaged in safety work. This committee meets quarterly, and its functions are as follows:

(1) The committee conducts thorough inspections of all plants of all subsidiary companies from the stand-point of safety. These inspections are in addition to those made by the companies themselves, and are conducted by inspectors selected from companies other than those operating the plants in question. These inspectors report and are responsible to the Safety Committee and not to the companies whose plants are under inspection. From time to time, and whenever special circumstances seem to require such action, the committee, or various members thereof, make these inspections themselves.

(2) The committee acts as a clearing house for all information relating to the safety of employes. All safety devices and other methods of increasing the safety of the workmen and of interesting the men in their own safety and that of their fellow workmen, are reported to the committee by the subsidiary companies in which they originate. These safety methods and devices are carefully considered by the committee, and if approved are recommended to all the subsidiary companies, often with improvements suggested by the committee. In this manner descriptions with full details, photographs, diagrams and complete information of all matters dealing with the safety of employes is disseminated among the subsidiary companies.

(3) The committee at its quarterly meetings considers all serious accidents which have occurred in any of the companies during the preceding quarter, with a view to devising means for preventing the recurrence of similar accidents.

(4) In addition to its work for the prevention of accidents, the committee assists in the administration of the Voluntary Accident Relief Plan, and considers any questions of general character which arise in the administration of the plan.

The committee is endeavoring, now, to standardize those safety devices which are in use upon machinery common to a large number of the different plants. It is hoped thus to insure the use of only the most improved and effective safeguards.

As a further help in familiarizing the superintendents and foremen of the different plants with the safety devices approved by the committee, a Safety Bulletin is issued periodically, showing engravings of safeguards, and working drawings of devices, with a full description of their operation.

My future remarks and the views of safety devices shown will necessarily be confined largely to the work being done by the Illinois Steel Company for the prevention of accidents at its several plants.

It is obvious that the industrial plant which would seriously take up the problems of accident prevention must undertake (first) to provide and maintain proper working conditions and efficient safeguards, and (second) to educate its employes and inculcate in them habits of caution. This, of course, requires a definite plan and a comprehensive organization to carry out such a plan.

In handling this work the Illinois Steel Company has divided it into three closely allied headings:

THE SAFEGUARDING OF DANGEROUS PLACES.
THE PROMULGATION OF RULES FOR SAFE OPERATION.
INCULCATION OF HABITS OF CAUTION IN
THE MINDS OF ALL CONCERNED.

The Safeguarding of Dangerous Places

It might be said in this connection that although statistics show that failure to guard dangerous places is not the most prolific source of accidents, carelessness in this regard has a most marked effect, consciously or unconsciously, upon our thoughts and actions, and is, therefore conducive to reckless habits. What folly it would be to try to endorce rules or train the workmen into thinking of their own and others' safety if we did not show our desire to prevent accidents by doing all in our power to make working conditions as safe as possible. [At this point Mr. Young began his stereopticon lecture and threw many views upon the screen as he talked.]

The Illinois Steel Company operates five plants—each plant covering many acres and employing thousands of men. The plant at South Chicago, for instance, covers about 400 acres, and, when running full, gives employment to about twelve thousand men. Across the train yard of this plant has been installed a very important safety device—a viaduct 422 feet long, which we believe saves many lives and limbs annually. At another entrance to the plant is a subway under the railway tracks. This subway is also used as a time clock house. Sometimes there is a railway track between a roadway and a mill, and in that case, where practicable, a viaduct is provided. The roadways throughout the plant are macadamized, and being well defined have a tendency to keep the men from taking dangerous short cuts over tracks.

At all of the entrances to the plants of the National Tube Company illuminated signs are displayed upon which are shown safety precepts. These sermonettes, which continually remind the men that to a large extent they are their brother's keeper, are painted on glass slides, in English and foreign languages, and are changed periodically.

We have also copied from the National Tube Company the idea of calling to the attention of men asking for employment the stress that is laid upon the prevention of accidents. There is a sign at the employment bureau stating that if men are not willing to be careful of their own and others' safety, we do not want them in our employ.

To give some idea of the tonnage handled at our ore docks, I am showing you a view of the ore boats in one of our slips. At the docks of the South Chicago Plant, 3,826,000 tons of iron ore were handled during the season of 1910, and in handling these 3,826,000 tons of ore there were no accidents causing the loss of more than two weeks' time to any man. There were four men injured during the year who lost less than two weeks' time each. At the docks where iron ore is taken from vessels by machinery, all of the unloaders have been thoroughly equipped with ladders, stairs and railed walks, and the rails carrying the motive power to the machines have been guarded to prevent a man accidentally coming in contact with them.

At different points along the main roadways of the plants are signs regarding the prevention of accidents, and reminding the men of the necessity of being familar with the safety rules.

All trestles from which material is handled are equipped with walks. All walks are railed, and at the base of the railing is a guard board to prevent material or tools falling on a person passing below. Where there is a driveway or passageway under the trestle, it is completely planked over at that point between the rails and between the tracks. Where there are several tracks on these trestles, a walk is provided down the center of the trestle for the use of switchmen and men dumping the cars. Under these trestles are pockets in which the material is stored. The gears operating the drums forming the bottom of these pockets are covered, and a rope safety line is stretched the entire length of the pockets, which, if pulled, cuts off all power, sets a brake, and stops all machinery.

A view is shown of a thin shelled, water cooled blast furnace. The stairs and platforms shown on the furnace are to facilitate safe inspection of the furnace and water cooling apparatus. At blast furnace plants all stoves and furnaces are connected by walks provided with hand railings and guard plates at the base of the railings. Each cast house is equipped with stairs or runways leading away from the furnace, so that in case of a breakout the men can quickly leave the danger zone. All elevated floors are railed; the cast houses are roofed with steel plate to protect the men from material blown out of the top of a furnace; and the side sheeting on the cast houses is brought down so far that storms cannot beat in on the runners. One of the main precautions to be taken in handling hot metal is to keep all utensils dry.

Where ladles are loaded under the floor of a cast house, the casting holes are guarded by grates. The whistles in the blowing engine room are operated by a switch placed behind a shield, together with the furnace pressure gauge and the snort valve lever. When the switch is thrown in—to blow the whistle—it lights an electric lamp placed above the switch, which shows that the circuit is complete. It also lights a lamp in the blowing engine room—showing which furnace is signalling. The shield is for the purpose of protecting the man giving the signal or operating the lever to reduce the pressure should something go wrong with the furnace. All bustle pipes on furnaces are equipped with railed walks. Men are not allowed to go on the bustle pipes or anywhere above the furnace floor without permission from the foreman in charge of the furnace. He stations another man to watch this man while he is above, to guard against the dangers from gas.

The mud gun, which is used in stopping the tapping hole of the furnace, is equipped with a funnel-shaped casting to prevent the men attempting to kick the mud, which collects on the cylinder, into the hole, thereby endangering the catching of their feet by the plunger. Since the installation of these guards some four years ago, no accidents have been caused in this way. Prior thereto a workman lost half of one of his feet.

It is sometimes necessary to work where there are large quantities of gas, and the men are provided with safety helmets to be used in doing this work, or in doing rescue work. Each blast furnace plant, and each gas engine plant is equipped with these helmets, and a carefully trained corps of men is always on hand.

On all large gas pipes used in blast furnace plants or at gas producers, the tops of the pipes are provided with hand lines to keep men from falling off. The weights on the explosion doors on these pipes are provided with safety chains, so that should the hinge supporting the door break, the weight or door cannot fall on men passing below.

On the gas washing apparatus has been installed a system of platforms and stairs. At the base of the stairs there is a railing to prevent a person, descending the stairs suddenly, from stepping on the railroad tracks which pass close by these washers. Causing him to walk around the end of the railing calls his attention to the danger from an approaching train.

In the open hearth plants, on the side of the building, on a level with the overhead electric crane track, are built platforms for use in crane repairs. There are three of these platforms along this floor. This does away with the necessity of using swinging scaffolds in repair work. On the pit side of the open hearths, where the steel is poured into moulds, and immediately back of the cage of the cranes handling the molten metal, there is an escape platform for the crane-man, to be used if there is an explosion of hot metal. This platform extends through the side of the building, and is provided with railings and stairs giving the crane-man a quick means of egress from the danger zone. In rebuilding an open hearth furnace, the furnace and ports are torn down a number of feet below the charging floor, and in order to prevent material being knocked down on the workmen, a plank fence is built at the top of the opening. Prior to the installation of this precaution, it was not uncommon for a workman to sustain injuries from this source—one poor fellow sustaining a broken back.

Whenever it is possible to provide platforms for the use of oilers, this is done as a safety precaution. Where practicable, the use of ladders is forbidden.

At the spiegel cupolas, where the cinders drop through a hole in the floor to the cinder dump, steel guards are placed to avoid accidents at this point. The doors at the bottom of the cupolas are usually held shut by a steel prop, and in order to drop the cupola when cleaning out refuse, these props are knocked out with a long bar. The dropping of the doors is accompanied by sheets of flame, and in order to protect the men steel guards have been placed, with holes through which the bar used in knocking out the props is inserted. Prior to the installation of these guards, a man working on the night shift had lain down back of these cupolas, and was not seen by the man dumping them. He was so seriously burned by the flames that he died.

When the cupolas are relined there is danger of loose brick falling from the stack on the men. To prevent this a screen is put in at the top of the cupola, so that should a loose brick fall the screen will catch it. The tops of dolomite cupolas frequently are covered only by the "I" beams upon which the tub rests when it is dumped. It is important that cast gratings which entirely cover the top of the cupola, except where the tub is dumped, be installed, making it impossible for a man to slip and fall into the cupola. It is also essential that the platform at the top of these cupolas, which is about thirty feet above the ground, be equipped with a railing and a high guard at the base of the railing, to prevent material being knocked off on men below.

In the electrically operated mill motor room, guards are placed over the driving shafts. These guards are so constructed that they can be lifted off. In the mills guards are placed over all shafting and sprocket wheels close to the floor. A viaduct is placed over the butt conveyor pit, and a railing is placed on the mill table to prevent workmen backing off into this pit. In the billet mills, where the tables are low, the guards are so constructed that they cover the table shafting and the sprocket wheels and the shafting on the floor, at the same time giving easy access to the top of the tables.

Subways or viaducts are provided where passageway across a mill is required. This does away with the temptation of climbing over the tables instead of going around, thereby endangering the workman being struck by the hot steel moving on the tables. The subways are roofed with plate to prevent hot scale from the steel falling into them, and all shafting passing through the subway is enclosed.

To protect a workman standing back of a mill roll, while operating a table, from scale which flies from the steel as it passes through the rolls, glass shields are installed through which he looks as he operates the levers.

One of the most important rules that we have is that all levers controlling the operation of machinery shall be so constructed that they may be locked when on center, making it impossible for the power to be turned on accidentally. Workmen are required to attach a warning sign to this lever lock before working on the machinery. This style of lock requires the use of both hands as the lever cannot be moved without depressing the spring and turning the locking device down.

At machinists' headquarters, and at points where operators congregate, are displayed large signs bearing the wording: "Never work on a table, crane or other machinery before notifying the operator and attaching a danger tag, bearing your name, at the point where the power is turned on. Get these tags from your foreman." The workman's name is either printed or written on the tag.

A protection is placed over the roll train spindles, or driving shafts of bar mills. These shafts are about three feet from the floor, and the guards are on legs, making them light and convenient for handling. The ends of the wabblers on these roll trains are guarded by steel shields. It has been said that these wabblers—which are, in fact, the ends of the roll necks—are not dangerous, but one instance has come to my attention where a workman's clothing was caught on one and he was killed.

At the ends of all loading beds are placed guards which will prevent material falling off, but which can be lowered when the material is loaded in cars. The material is stacked on the beds, and there is a possibility of a piece falling off and striking a man walking on the track below. This was brought home very forcibly by the death of a foreman who had been in our employ over twenty years.

At sheet mills, chain conveyors frequently are used to carry the plates from one table to another. A semi-circular plate shield is used in a situation of this kind to guard the sprockets and chains as well as the table shafting and gears. All belts and pulleys are guarded to a height of at least five feet.

An economical and simple way of guarding shafting is by using a guard consisting of a steel plate bent into a triangle or inverted "U" and attached to the bearings and gear guards. In sheet mills, where the plates are partially straightened by pressure applied by means of worm gears, cast guards are placed over the worms.

A railed platform is installed on a roll housing to provide for the safety of the men working on top of the rolls. A safety rope is stretched in front of the rubber mixing rolls in the plants of the American Steel & Wire Company, and is attached to a switch controlling the motor driving these rolls, so that the rolls may be stopped instantly by pulling the rope should a workman become caught. In blooming mills a mask is provided for the man working at the rolls, to protect him from sparks and scale which fly from the steel being rolled.

In the plants of the American Steel & Wire Company automatic stops are provided at the wire drawing blocks. The rod or wire which is being drawn is carried through the eye of the lever connected with the motive power, so that a snarl in the wire will throw this lever forwards and stop the block. In addition to this safety device, a rope is attached to the lever, carried over the shieves above the frame, and down at the right hand side of the block, so that if a man should be caught and drawn around the block he would strike this rope and stop the block automatically.

In order to guard the belt on a cone pulley, it was found necessary to devise a shifter which could be worked through the guard. Mr. Kilts, a member of one of our Mechanical Safety Committees, has invented such a shifting device. It is not only a perfect safety device, but it has been found that it increases the speed of operation. This shifter is so constructed that it is impossible to run the belt off the end of the cone.

It has not been customary to place guards over the feed gears of a planer. Investigation showed, however, that men have lost fingers in these gears by attempting to adjust them while keeping their eyes on the job at the planer. They have, therefore, been installed on all planers. The workmen at first objected to these guards as they thought they were unnecessary and a nuisance. They have been in use for some time now, and the men raise no further objection to them, and are, in fact, become as enthusiastic as the Mechanical Safety Committee in devising new ways to prevent accidents.

We require that all emery wheels over eight inches in diameter shall have a safety taper of ¾″ to the foot and be provided with safety collars. This means that the wheel will be convex in shape, while the collars will be concave, and should the wheel break (split), it being thicker at the hub than at the face, the pieces are held in place.

The standard requirement for gear guards is that the gears shall be covered on the sides as well as on the face, and that the guards shall cover the gears to such an extent that the danger of being caught between the end of the guard and a cog of the wheel will be eliminated.

Band saws have a hinged guard covering the top and front of the saw, to prevent the saw flying should it break, and a head guard extending down the front of the saw to prevent the workman's head accidentally coming into contact with the saw. The saw, below the table, is encased.

A different style of circular saw guard has been devised by Mr. Walker, a Foreman of the Tenn. Coal, Iron & R. R. Company. It consists of a hinged arm extending over and covering the saw, and supported by a wheel resting on the saw table. The size of the wheel depends on the thickness of the wood sawed. For instance, a saw cutting up to 3″ material would have a guard wheel of from 7 to 8″ in diameter. Mr. Offutt, of the National Tube Company, has devised a guard which, in addition to guarding the saw, is used to shove the last end of the piece through the saw, and which is a very important provision.

We feel that the belts and pulleys in the carpenter shop should be so guarded that there will be no danger of timber being caught in them. They are entirely enclosed in steel casings.

It is important that the knives of a wood joiner be guarded. We have used a guard over these knives for a number of years which we have found to be satisfactory since it has been equipped with a stronger spring to draw the guard back. However, one of the best safety devices for these machines is a safety cylinder, which, instead of pulling the man's hand into the knives, throws it out of the machine, and instead of losing his fingers or hand he sustains comparatively slight cuts. We had an actual demonstration of the efficacy of this style of cylinder recently. The workman was planing a short piece when it slipped and his hand went into the machine. Instead of being seriously hurt he received only a slight cut, and after having it dressed returned to work.

Men working on high elevations such as on smokestacks, have usually placed their dependence on one set of tackle. It is now a rule that these men shall wear safety belts and life lines which are attached independently of the other tackle, so that should the tackle holding the scaffold break, the man will be supported by his life line. This is another proposition which the men did not take to kindly at first, but which they would not now work without.

It is compulsory that men chipping rolls wear masks to protect their eyes and face. Another instance of a safety device that prevented an accident, occurred with a man who was pouring babbitt when it exploded. Had he not been wearing an eye shield he would have lost the sight of both eyes.

In the foundry where there is a large receptacle known as a mixer, in which iron is retained before it is poured, a plate fence, instead of railings, is placed around the platform, to prevent the crane hooks from catching. The levers controlling the operation of this mixer are guarded with plate shields for the same purpose. In the foundry, the brass converter is provided with a spark shield. I would call attention to the necessity of a locking device being attached to the wheel used in tipping this converter, as when heavy with skull it will tip over if not locked. We have had an actual demonstration of this. A large percentage of accidents occurring in a foundry are from feet being burned by slopping metal. It is important that the workmen wear whole shoes, and that they be so constructed that they may be slipped off quickly. We urge upon the workmen the advisability of wearing "Congress" shoes. Many accidents are prevented by placing a guard on the foundry hand ladles. This consists of a steel shield on the side of the ladle over the handle. If the workman stumbles and slops the metal, the shield protects his hand.

The ends of piston rods extending beyond the cylinder heads should be guarded, the purpose of the shields being to prevent a man getting so close to the cylinder that he will be struck by the rod.

In the boiler house, a railed walk is placed on each boiler and leads from boiler to boiler. The water gauge glasses should be guarded. A guard devised by the American Steel & Wire Company is a semi-circular shield so constructed that it may be turned around, coming between the workman and the glass while the glass is being tested or heated. It is then turned back of the glass, giving an unobstructed view of the gauge. To assist in seeing the water line, there is an electric lamp installed at each gauge.

Each boiler is equipped with a non-return valve, so that if a tube bursts, or there is some other explosion, the valve closes automatically, and the steam cannot rush into this boiler from the other boilers. All relief valves are piped through the roof so that steam will not blow off in the building. There are a number of precautions set forth in our boiler house rules, such as numbering boilers, blow-off line relief, stop valves, valves in feed-water connections, drains in pockets, etc., to which I would refer you.

All flywheels are guarded either with plate or wire net guards. Where the protection is within eighteen inches of the wheel it is five feet high, and where it is more than eighteen inches from the wheel it is three feet six inches high, which is the standard height of all railings. The guard is carried over the bearings of the wheel at the same relative height.

At all points on engine beds where the oiler may have occasion to walk, railings or plate guards are provided. The governor balls are guarded. The governor is driven by a three-rope drive—dependence not being placed on a single rope or belt. A device has been installed which will show when a strand in a rope of a rope drive is broken. The broken strand strikes a board hinged to the pulley guard, throwing the board back, and attracting the attention of the engineer.

One of the greatest sources of accident is the overhead traveling crane. All overhead cranes are provided with railed walks on both bridge girders, extending the entire length of the crane. The trolley or carriage is entirely floored and provided with a railed walk. Each hoist is equipped with an over-hoist limit switch, which prevents running the blocks into the drums, probably breaking the cable and dropping the load on workmen.

Each crane has a safety switch, installed on the bridge, which will cut off all power, making it impossible for an absent-minded operator to forget that men are working above and start the machinery from the cab. When a man goes on top of a crane he pulls out this switch and puts his "Danger—Do Not Move" sign on it. Each crane is equipped with guards extending out from the truck wheels, the purpose being to warn a person resting his hand on the rail of the approach of the crane, which he might fail to note because of other noises. The number of arms and hands lost by persons working on scaffolds along crane runways thoughtlessly resting against the runway and failing to notice the approach of the crane is appalling. Four instances have come to my attention during the past year where these wheel guards have prevented such accidents. All trolley gears and the truck drive gears are guarded. The flooring over the trolley carriage is important both from a safety standpoint, and from an operating point of view. It prevents the falling below of pieces of machinery and makes a good repair platform.

Where ladders have to be used in getting to and from cranes, a landing platform is provided at the top of the ladder, with a short ladder leading from the platform to the cage. This prevents a man climbing the main ladder so high that he can take hold of the power rails. Where possible, stairs are provided.

Where practicable, steel walks, with proper railings and toeboards, at the base of the railings, are placed parallel with all crane runways. This is not only an important safety precaution, but is of great assistance in operation. All Gantry cranes are equipped with fenders over the truck wheels, a walk the entire length of the crane bridge, a safety switch on top of the bridge and with automatic warning bells.

All switchboards carrying a voltage of over 250 volts are encased, making it impossible to accidentally come in contact with the live parts. The guard on the front of the board is semi-circular, with the handle projecting through it. The fuse blocks are covered with an asbestos-lined steel box. The back of the board is covered with a plate, and all guards are grounded to the board, which, in turn, is grounded. Each board of this type is equipped with disconnectors, making it possible for the board to be rendered "dead" when it is necessary to work on it.

Many signs are printed in the form of pictures and are posted on dangerous electrical apparatus, for the benefit of the men who cannot read.

All elevator wells are provided with automatic safety gates at each landing, and with warning gongs to be sounded before the elevator is moved. When elevators are operated by electric power, there is a safety switch at each landing, which when pulled out cuts off all power and sets a brake, making it impossible to move the elevator.

The danger of being caught between the locomotive crane boiler and the truck frame as the crane boom is swung back and forth may seem remote, but reports show that such accidents do occur. The device shown here makes a fence around the danger zone while the crane is working, but it can be folded against the frame when the crane is running through the yard. Where a railroad track runs close to a building, railings are placed at the corners of the building to prevent men suddenly stepping from the building onto the tracks. Where there is a narrow space between the building and the track in which a man might attempt to stand as a car is moved by and be crushed by the cars, an inclined plate is placed, making it impossible for the man to get into this dangerous position.

A safety bar placed across the opening in a railing at the head of stairs, with a lug back of the bar which prevents throwing it back so far that it will not drop automatically into place across the opening, is obviously an important precaution.

In the guarding of valve pits and trap doors, the Barnhart cover is so devised that three sides of the hole are guarded when the cover is up. The rods drop down out of the way when the cover is closed.

Cleanliness about the shops and yards cannot be too strongly urged, as there is no question as to its being a factor in causing the men to be more cleanly about their work, and in preventing accidents due to cluttered-up or untidy conditions.

Recognizing the fact that in every trade, either by reason of carelessness or trade risk some accidents are bound to happen, the Illinois Steel Company has made ample provision for the care of its men when injured, by providing dispensaries and hospitals which are in charge of an efficient corps of graduate doctors.

THE PROMULGATION OF RULES FOR SAFE OPERATION

The Central Committee of Safety of the Illinois Steel Company, about which I will speak later, has been and still is engaged in standardizing safety measures and devices. After careful consideration it adopts and recommends for use at all plants of the company such devices as seem to be most efficient, and likely to best prevent accidents. A book of plans for devices for safety has been prepared under the direction of this committee, for the purpose of standardizing the safety appliances and precautions necessary to protect employes from the dangers incident to machinery and unsafe working conditions, and to insure the provision of efficient safe guards and proper working conditions at the time construction work is planned and machinery is installed, as well as to show the conditions to be maintained during operation. This book has been prepared in loose leaf form so that additions or amendments may be readily made to it. The plates in this book are reduced drawings of actual construction and are intended to be used by the engineering department as examples only. The dimensions shown are not required to be followed unless they are made obligatory in the text of the specifications which appear upon the page opposite to each plate. This descriptive matter is taken from the Construction Rule Book, which will be mentioned later, and incorporates all of the requirements appearing in that book in an abbreviated form. On all plans or specifications for new construction or work by way of replacement it must be shown that a check has been made for safety, and it has been made the duty of superintendents of plants to see that safety devices and precautions provided for in our book of standard safety devices are complied with before machinery or plants are put into operation, and that they are thereafter maintained; no new machinery or new plant may be put into operation unless the same has been first approved for safety by the safety inspector, except upon the specific order of the general superintendent or assistant general superintendent of the plant. No machine tools may be ordered unless it has been shown that the plans and specifications therefor have been checked for safety.

This committee has also prepared with great care a book of rules respecting safety in operation. This book is gotten out in two forms. The first for the use of superintendent and foreman, printed in the English language, includes: General Instructions from the president of the company, Regulations respecting Coöperation of Workmen, Rules Governing the Construction and Installation of Machinery and the Physical Conditions to be Maintained (which covers the same subjects as those mentioned before as being covered by the book of Standard Safety Devices), and Operation Rules for the Safety of Employes. The second for the use of employes, printed in the several languages spoken, is distributed to all employes of the company, who may not be superintendents or foremen, and contains the same matter as the other form, except that the rules governing the construction and installation of machinery, etc., are omitted.

These rule books, as stated, are placed in the hands of all employes of the company, and each employe is required to read the same and to satisfy his foreman that he has read it and is familiar with its contents, and both the foreman and employe are also required to sign a statement to that effect upon a form provided for that purpose. All men when placed at work upon new jobs entailing any hazard at all, must be fully instructed by the foreman in charge as to all dangers incident to the work, and when the foreman is satisfied that such workman understands and is aware of all such dangers, he is required to so certify to the department superintendent upon a form provided for that purpose, upon which form the workman also states that he has been instructed, knows the dangers, and will be careful of his own and others' safety. The signing of such statements practically insures against perfunctoriness in these details.

The safety committee has also prepared and had printed rules governing the use of high explosives, copies of which rules are placed in the hands of all persons having anything whatever to do with the handling of dynamite, or other high explosives.

THE INCULCATION OF HABITS OF CAUTION

Contemporaneously with the organization of the United States Steel Corporation safety committee, and to the end that the greatest benefit from individual experience might be obtained, a Central Committee of Safety was some three years ago organized. This committee consists of the safety inspector and assistant general superintendent of each of its plants, together with the general attorney, who acts as chairman of the committee, his assistant in charge of accident matters in the law department, an official from the statistical department, who acts as secretary of the committee, and a stenographer, who takes a record of all the proceedings of the committee. This committee meets at the main office of the company at Chicago every two weeks for an all-day meeting. At these meetings all accidents occurring at the several plants of the company, which are in any wise serious in their results, are discussed and ways and means devised for the prevention of the occurrence of similar accidents at the same or other works, wherever this is possible. General conditions are likewise examined into, and if, in the observation of any of the members of the committee, any safety precautions or devices seem to be desirable or necessary, the committee considers the same and makes appropriate recommendations. The recommendations of this committee are accepted and put into force at all plants without question, unless some special circumstances make it impossible to do so.

In considering the questions that come before this committee, it does not depend solely upon the judgment of its members, but it is the practice of the committee to obtain the advice and judgment of the men at its several works, who are specialists upon the particular branch of the work that may be involved in the question under consideration. All matters that are considered, except possibly some minor ones, are first made the subject of discussion and consideration at meetings of the department superintendents at the several plants and are gone into by the members of the committee at each plant very carefully and thoroughly with the heads of the departments in which the particular situation may exist, and are also gone into, where possible and advisable, with special committees, such as of blast furnace superintendents or chief electrical engineers, etc., and the permanent and workmen's committee, which will be mentioned later.

All of this is done for the purpose of obtaining the very best judgment that is available in the consideration of the more important questions that come before the committee, and to the end that when any action is taken and a recommendation made by the committee, it may be sure that the best results will be obtained. This procedure of conferring with the department heads and others at the several plants also aids much in facilitating the early installation of any device that may be decided upon, as the same are more often than not the result of the thought of the men themselves.

The statistics of foreign countries (as well as those of the United

States) show that the large majority of accidents is due to a lack of care on the part of those injured, or on the part of those with whom the injured was working, and I believe we will all agree that the acquiring of habits of caution is the secret to success in this work.

One of the first steps taken by the Central Committee of Safety to interest the men and assist in inculcating habits of caution into their minds was the organization of safety committees at all the plants of the Illinois Steel Company. Two plans have been followed in this work, namely—the organization of committees composed of foremen, known as Permanent Safety Committees, and the organization of committees composed entirely of workmen below the grade of foremen, called Workmen's Safety Committees.

Permanent Safety Committees

Each department has a committee of foremen, known as the Permanent Safety Committee because the personnel of the committee does not change. It is the duty of this committee to make monthly inspections of their departments as a committee. It is also their duty to see that all safety devices approved by their superintendents are installed, and to investigate all accidents where the injured man loses two weeks' time or more, or where there is some special feature in the case. In making this investigation they report how the accident occurred, what they think can be done to prevent a similar accident, whether in their opinion anyone has been negligent, and what they think should be done with the negligent person.

This inquiry into the alleged guilt of an employe by a "jury of his peers" has had a very beneficial effect, and has done much towards reducing the number of accidents. Care is taken by the superintendents to see that the investigations made by the committees are not merely perfunctory, and their reports have been very satisfactory. Where the injured man has been careless the committee does not overlook the fact, but lets him understand that they do not approve of his actions.

Workmen's Safety Committees

The plants are divided into divisions, each consisting of three departments or mills. One workman is chosen from each department to act as a member of the committee, to inspect for dangerous places, to consult with the men at their work and get suggestions from them as to safer methods of doing that particular work, and, incidentally, to sow seeds of caution. These men serve on the committee one month and spend one day each week inspecting their division.

When a committee is organized, all of the superintendents of the departments making up that division meet with the committee and the safety inspector, and the nature of the work is gone over with the committee—impressing upon them the interest taken in the work by their superintendents. We believe that this committee work is causing the men to take more of an interest in their own and others' safety. The men are urged not to drop the work after their term on the committee has expired, but to continue to report any change that they think would be beneficial, and it is a pleasure to note that many of the men continue to make suggestions after their term on the committee has expired. The superintendents advise that it also has caused other men, who have not served on a committee, to come to them with suggestions.

In directing the work of the committees we have inter-division and inter-works inspection—having a committee inspect a division or a plant other than its own, thereby creating a rivalry among the men, and, at the same time, giving the work greater importance in their eyes, and making it more of an honor to be selected as a committee-man.

BULLETIN BOARDS

As a further assistance in the inculcation of habits of caution, in each department and at each plant entrance, Safety Bulletin Boards are installed. Upon these boards are displayed the list of departments successful in keeping in the "booster" class during the past month, i e., the departments that have keep their accidents below a certain percentage. Clipping bureaus supply the plants with newspaper reports of industrial accidents occurring throughout the United States, and these clippings are posted on the boards, together with rules and photographs of devices of the Illinois Steel Company which would have prevented the accident. In addition to this is posted any other matter or photographs which will attract the attention of the men and keep them interested in safety.

CIGARS

Another stimulant to the advertising of safety is the distribution of cigars with the "Boost for Safety" bands. Boxes of these cigars are distributed among the foremen and workmen whenever records are made in keeping down accidents, or when suggestions for safety are made, or whenever it appears that the giving of cigars will help the cause along.

PAPERWEIGHTS

"Boost for Safety" paperweights are presented to the foremen and workmen—the idea being to keep always before them the fact that the safety of workmen is the first consideration.

BUTTONS

The plant managements have caused to be made a badge of distinction which is presented to each man showing a thorough knowledge of the safety rules. The workmen, as well as foremen, compete for these badges. It is, however, compulsory upon the foremen to take an examination on the rules and precautions governing the prevention of accidents. In order to obtain a badge it is necessary that an examination be passed with an average of at least 90 per cent efficiency.

This move is not only insuring a better knowledge of safety rules and precautions on the part of the foremen and workmen, but the eagerness with which all classes of workmen are competing for the buttons, and the pride shown by those successful in obtaining them, has proven it to be a valuable aid in the inculcation of habits of caution into the minds of the men.

A very natural question in view of what has been said as to organization and safeguarding work is—what has been its effect? While satisfactory statistics are not available at all of the plants of the corporation from which a comprehensive comparison can be made, however, the effect of the work at the Illinois Steel Company is a fair example of what this character of work can do. From these statistics we find that serious accidents have been reduced since the energetic safety campaign has been instituted by from fifty to sixty-six and two-thirds per cent.

GENERAL DISCUSSION

Louis Guyon, *Chief Inspector of Industrial Establishments and Public Buildings, Province of Quebec:* I feel highly honored at having been called upon to address you on the subject of preventive measures against accidents in factories and workshops. When I received your kind invitation I was not aware that I would have the pleasure of meeting the members of an organization so closely related to the International Association created in Paris in 1900, and of which, I am proud to say I was then an enthusiastic member delegated by the Quebec Provincial government.

Before I enter upon this subject allow me to offer my sincere congratulations to Mr. Calder for his splended paper and at the same time permit me to tell Mr. Young how much I have enjoyed his very remarkable lecture and exhaustive treatment of the subject of safeguards. As President of the International Factory Inspection Association I would have been pleased to have all the members of our Association in this hall to hear and see what private initiative can accomplish when the efforts put out are in the hands of competent men.

Referring to what has been accomplished in our province in connection with preventive measures, I am glad to say that we have closely followed in the footsteps of the older organization in Europe. Delegated to the accident congress in Paris in 1889 and again in 1900, I had the pleasure of attending the first congress on labor legislation and of handing in to its president the first official document for discussion—a copy of the International Factory Inspectors' Report. Many of the manufacturers of our province, strong partisans of preventive methods, having subscribed various sums for the purchase of appliances in France, and on the other side, our provincial government taking interest in the matter and also lending pecuniary help, a Museum of Appliances was organized under control of the Inspection Department in Montreal in 1902. From year to year models were added until the creation of a large technical school made it possible to install all our models in one of the spacious halls placed at our disposal. The school authorities quickly realized that the school where our future master mechanics would be prepared was the most suitable place for such a museum, as the students, in studying better protection in mills and factories, could also build models and enlarge the collection at a minimum cost.

The adoption of a law for compensation to injured workmen has brought the matter of prevention still more to the front. Our compensation law has had over a year's trial and though not perfect, is doing well and relieving the situation. Its application has had the effect of reducing the inspector's work in court, and so far, the workpeople seem to be satisfied. In striving their utmost to introduce safeguards and better modes of protection the provincial inspectors have realized that they are first and foremost—preventive officers. Their mission, their very "raison d'être"—is the number of lives and limbs that can be saved and the number of people that can be protected against disease in our workshops and factories.

Mr. Don Lescohier: "Have you ever had any experience in Quebec in the specialization of factory inspectors, that is to say, in the assignment of the various inspectors to special problems, such as elevators, setscrew and shaft guards, particular industries, such as wood working or metal manufacture?" Mr. Guyon: "No, but I believe that it would be a good thing." Mr. Leschoier: "We have already specialized one of our inspectors upon elevators and setscrews, and are considering the advisability of devoting particular men to particular industries. This would involve extra traveling expenses, since each of the several men would have to make each town, but the expense might be very profitably incurred."

C. W. Price, *Superintendent of Welfare Work, International Harvester Co., Chicago:* I shall not attempt to add any new points to the discussion for the reason that I cannot; every point that occurs to me as vital in the promotion of protection against injury in factories has been well covered by the former speakers. I should like, however, to emphasize one point which was made by Mr. Calder regarding the need on the part of states to furnish information to manufacturers regarding the best methods of promoting safety. From what I have learned, I should judge that practically none of the states has done much along this line.

A few days ago I was talking to the Assistant State Factory Inspector of one of the middle states, where there has recently been passed a most stringent law regarding the protection of machinery; the inspector said to me that since the new law has been in force his department had not met with any opposition from manufacturers; on the other hand, they had had hundreds of inquiries from manufacturers for information which would help them to equip their factories along the most practical lines. Those on the outside of the manufacturing world, who criticise manufacturers and accuse them of not being interested in the subject of protection, are simply mistaken. There is a widespread awakening among all progressive manufacturers regarding the economic value of protecting their workmen from injury, as well as the moral obligation to do so.

In view of this general demand on the part of manufacturers for reliable information and help along this line, it seems to me that it devolves upon every state to organize in connection with its factory inspection department a bureau of information which shall be able to disseminate widely the results of the experience of manufacturers in America and in Europe who have done good work along this line. An exhibit should be organized which should include photographs and blue prints and models of guards which have been found to be practical. These exhibits might be arranged in such forms as to make it convenient to move them from one part of the state to another.

In addition to information concerning guards, the inspector's office should place in the hands of manufacturers information regarding accidents which would call attention to points of danger which manufacturers are apt to overlook or underestimate. For instance, if you should go into many factories and say to the foreman or superintendent that all elevators should be equipped with gates six feet high and should come down flush with the floor, and the cars should be equipped with screens overhead to prevent parts from falling on the passengers, they would probably laugh at you and say it would be impractical; but if you should place before them statistics regarding accidents caused by the absence of these two guards, you would probably be able to convince them of the practicability of the suggestion.

In other words, the factory inspector's office should be in a position to give each manufacturer the benefit of the experience of all other manufacturers, and thus to gradually educate them up to a high standard of safety.

Mr. Don Lescohier: "Have you found that the 'round head' jointer is not as good for fine work as the old square head?" Mr. Price: "We have found the round head to do better work than the square head jointer on any kind of work. It is not only safer; it is also better from a manufacturing standpoint."

FERD. C. SCHWEDTMAN, *Chairman, Industrial Indemnity Committee, National Association of Manufacturers, St. Louis:* I have followed with pleasure the remarks of our worthy chairman, Professor Seager and the interesting and profitable remarks of Mr. Calder, Mr. Young and Mr. Guyon. The trend of the arguments made so far at this meeting must convince a stranger of the wonderful possibilities which are open to this Association in future constructive work for the welfare of the nation. Fortunately, I am not a stranger and my opinion is not based solely upon what I have seen and heard here today. It was my privilege and pleasure to attend several meetings of this Association last year. I also had the opportunity to attend with a hand full of other Americans, the Sixth General Meeting of the Delegates of the International Association for Labor Legislation, at Lugano last year. The discussions at that meeting by the best men of many nations must impress even those skeptically inclined with the power of the movement which obtains its strength from the co-operative thought and activity of the factions which make up industrial nations. We found at Lugano the representatives of the governments, of the colleges, of the employers and of the wage workers, discussing with fervor, but not with prejudice, the solution of the industrial and economic problems which confront all progressive nations more or less alike.

But the strength of the international movement was not the only impression which Americans took with them from that meeting. We had to acknowledge with regret that the representation of the American section was not up to the high standard which our nation has reached in many other directions as compared with the representation of other nations. It is true we had some of our very best men and women there, but our delegation was not nearly as large and not nearly as representative of all factions; in other words, we have much work to do and a large field of endeavor to cover before we can be as proud of our coöperative efforts in shaping labor legislation as we are of our efforts in other directions, compared with European nations.

Speaking of the subjects which have been so ably discussed by Professor Seager, Mr. Calder and Mr. Young, let me devote a few minutes to a plea for harmony and coöperation. I come to you as the representative of the National Association of Manufacturers, the representative of an employers' organization with thousands of members some of which are located in every state and every city of the Union. I have no apologies to offer for the reactionary employer,—no more than I would expect anyone else here, representing another factor of an industrial nation, to apologize for the reactionary members of the profession or the craft which he represents. Employers as a class are no different from other men and women; the large majority of employers, the same as the large majority of all men and women, are law-abiding, conscientious and progressive people, who want to do the right thing if they only know how. Employers appreciate, as we all do, that to deal with the health and welfare of our people, the lives and limbs of our toilers, is to deal with the greatest asset of the nation. The scientific experts on subjects of this kind tell us that the vital assets of a nation amount to five times the physical assets, so that this little handful of men and women assembled here, is dealing with problems five times as great as those which will bring together hundreds of our nation's leaders in Kansas City a few days hence at the Third Annual Conservation Congress.

Let us remember in connection with our vital assets, the same as with our physical, conservation is the most important phase of the problem. I shall therefore not enter into a discussion of equitable compensation for injured workers. Important though this phase of the problem is, it is nevertheless secondary to the larger field of preventing accidents. But before dropping this subject of compensation let me state that the National Association of Manufacturers has consistently for several years advocated the inauguration of a compensation system to take the place of our antiquated employers' liability laws. I shall not discuss these principles for lack of time, but I want to say that in adopting them we have not been swayed by the advantages of any one section or class of society; we have adopted principles for workmen's compensation laws which we think fair and equitable to all concerned.

And now a word on accident prevention. This problem is not different from many others which the nation has been compelled to take up, nor are we compelled to hew new paths and discover new methods. Other nations have preceded us many years in successful accident prevention activities. We need only to adapt foreign systems to our own,—to translate them into American terms and into American ways of doing things. We must make allowance for American ideas, American traditions, American characteristics. The difficulties which we encounter in endeavoring to do this are not near so much in the direction of technical and mechanical qualifications and appliances. Though the question of providing proper standards for factory inspectors, safety rules and accident prevention appliances, is enormous, it is to my mind secondary to the sociological or the human side of the problem. To get into the proper spirit is the most important part of the work. That the proper spirit prevails in many quarters is clearly demonstrated by arguments which have been made before this convention by the representatives of large corporations. Mr. Calder's clear analysis of the situation, Mr. Young's wonderful illustrated lecture, cover such an enormous field that we are not only enlightened, but we are bewildered, we are dumbfounded, we cannot possibly digest in a week, or a month, or a year, what has been placed before us in comparatively simple language in two hours. A person who is able and willing to spend all the hours of each day to a proper understanding of the subject cannot possibly keep up with every phase of the work. What, then, does this mean? It means that only by coöperation of the various forces of society interested in this problem can we hope to settle it. The men of affairs, whether in commerce, industry or science, must specialize and must depend upon the coöperative forces of many specialists to solve the problems.

How much of the problem of preventing accidents is to be solved by legislation, how much of it by voluntary action, I shall not endeavor to guess, but the fact remains that a large amount of work must be covered in both directions. We do not attempt to force our men and women to be healthy by legislation,—we only try to prevent them from committing suicide; we do not expect to make individuals leaders in righteous thought and action by legislation,—we only prevent them from becoming criminals. This, then, illustrates my point. There is a minimum that must be obtained by legislation,—a maximum which can only be secured by voluntary action; there are destructive tendencies which we must prevent by legislation; there is a great amount of constructive work which must be secured by voluntary action; but whether it be in legislation or in voluntary action, the coöperation of the various forces is equally important and neither the legislator, the statistician, the college professor, the factory inspector, the employer nor the wage worker, can hope to settle this problem without the coöperation of all the other forces.

The large establishments, such as the United States Steel Corporation, the International Harvester Co., the Remington Typewriter Co., and I could mention many others who have been leaders in the accident prevention movement in the United States, deserve a great deal of credit for their initiative, but compared with the small employer, their task is easy. They control many mills and large means; their field is large enough to employ specialists of high standing, but let us remember that more than half of the wage workers of the country are engaged in small shops. I know from the letters that pour into my office from small employers all over the country that these men are just as anxious to prevent accidents and treat their injured workers just as liberally as the large employers, but their task is, comparatively speaking, much more difficult. They can secure only in a small measure and by mutual organizations the results which exist in large establishments, as placed before us so strikingly today. Mr. Calder and Mr. Young have placed emphasis upon the fact that only by getting the proper spirit into the foremen and into the best of the workmen can fair results be obtained, even from the best accident prevention devices. It is very important in the first place, that all the small employers of the country are brought into the same spirit in which many of the large corporations are now attacking this problem and it is, in the second place, of the utmost importance that we show the small employer how to secure the right spirit and coöperation of his workers. The use of safety devices means oftentimes the learning anew of handling machines and mills. Human beings get into habits; they do not like to change their ways, especially when they become older. It is human nature to oppose a change unless we can be shown good reason for making the change. It requires an intelligent campaign of education to show all concerned the need for many changes in old methods to prevent future accidents. Accident Museums have been established for this very purpose in Europe and a very creditable beginning has been made in this country, but we cannot expect to create museums in every large city for many years to come. Bearing this in mind, the National Association of Manufacturers is carrying on its educational campaign through illustrated lectures, but even in that direction progress is slow and we cannot expect to cover the whole field through illustrated lectures. We are experimenting in St. Louis with a new educational method. We have daily half-hour stereopticon talks. There is not a word spoken during these daily meetings. The matter to be conveyed is thrown upon the screen in the form of illustration and description. The exhibition hall is centrally located and business men can stop in for five minutes or for half an hour on their way to or from luncheon and endeavor to digest a minute part of the whole problem. In order to make our lectures still more interesting we are having made special films for moving pictures, believing that these moving pictures will still further relieve the monotony of such a dry and serious subject as accident prevention. If the St. Louis experiment turns out successfully, and every indication points that way, the National Association of Manufacturers hopes to establish similar institutions in other large cities.

But while we are carrying on this campaign we full well appreciate that it does not cover the whole subject. Sickness prevention, which in many important respects is similar to accident prevention, is carried on now in so many various ways that it would be impossible to enumerate them all here. Hygiene, proper and plentiful supply of air, plently of sunlight, exercise, mental and auto-suggestion, are all considered of equal importance to medicine nowadays in eliminating disease and attaining a high standard of national health and well-being. Medicine, again, is administered in liquid and in powder, in pills and injections, internally and externally and it is only reasonable that a successful accident prevention campaign will consist of as many important integral parts as have been found necessary in a sickness prevention campaign.

Let us not for a moment believe that European nations have found accident prevention an easy task. It was my privilege to be present at a meeting in Berlin a year ago where 1300 of the best men of the empire met, not for a half a day, or for a day and a half, but for a whole week, to consider only a few of the more important phases of accident prevention and compensation. I was called upon for a few remarks at that time. I told the gentlemen assembled that I had come to learn, to ask questions, to secure their aid and cooperation in a national American campaign. I told them we were behind the times in matters of this kind but I also told them that although they are far ahead of us now, within ten years we hope to not only equal them, but to pass them in a scientific, systematic, efficient accident prevention and compensation system. My closing plea is,—Let us all be boosters for safety. I know everyone present here will help me to redeem my pledge.

David Van Schaack, *Director, Bureau of Inspection and Accident Prevention, Aetna Life Insurance Co., Hartford, Connecticut:* After such authorities as Mr. Calder, Mr. Young and the other gentlemen who have spoken of accident prevention, there is very little left to be said on the subject. I should like, however, to add a little emphasis to the educational side of the work, to which reference has been made—the education of both employer and employe. It seems to me that this is one of the most important features of accident prevention.

In connection with the education of the employer, I think we owe a great debt of gratitude to the large concerns which are actively engaged in safety work. These concerns have the best facilities for standardizing safety requirements and safety methods, for finding the real points of dangers within their range of work, and, through their experiments, determining the best methods of protecting these points. By stimulating among their several superintendents and foremen an interest in safeguarding, they can bring into existence a friendly rivalry between these men and call forth the utmost ingenuity in coping with puzzling conditions.

Not only does the work of these concerns aid the cause of accident prevention in the way mentioned, but the influence of their example upon other employers is of the greatest value. The smaller employers, who cannot afford safety organizations of their own, are more easily convinced of the value of safeguarding when it is brought to their attention that these great concerns are showing the deepest interest in this work. The names of these concerns, or of one or another of them, are well known to these smaller employers and they naturally look upon their managers as men of the keenest business sagacity. If such men show by the actual practice of safety methods that they believe safeguarding workmen to be of value to their plants, the smaller employer is the more likely to think that it will be of value to his plant—that safety work is not only humanitarian but is also a paying proposition.

As for the education of the workman himself, it is beyond question that the coöperation of the workman is vitally essential if anything like the majority of preventable accidents is to be prevented. We can adopt every known form of mechanical and material safety device, but accidents will continue to happen in unnecessarily large numbers unless the workman plays his full part in their prevention. I should like to see systematic education of the workman in safety methods not only in the shop, but in the industrial schools, in the training departments of our great industrial establishments, in the manual training departments of our schools, and even in the ordinary school classes.

The future workman who receives a preliminary training in an industrial school is more likely to go highest in his work later in life, and thus to reach a point where his views will not only actuate his own conduct but will have a decided influence upon that of others. If habits of caution are inculcated in him during the formative period of youth, when he is most inclined to be receptive, they will cling to him throughout life. This education of the rising generation of workmen is looking well toward the future, and it will be a slow process, the beneficial results of which will become manifest only by degrees and in the course of long time, but eventually it cannot fail to do much in aid of accident prevention. It will produce a steadily increasing number of workmen who not only will tolerate safeguards but will cheerfully use them and who, by force of habit, will be addicted to safe methods of working. The prevention of industrial accidents will necessarily be very incomplete unless this and all other methods of enlisting the coöperation of the workmen, future as well as present, are consistently and persistently followed.

Miles M. Dawson, *Consulting Actuary and Attorney, New York City:* We must all be greatly impressed by the safety devices which have here been displayed, but I do not think we ought to separate, without fixing two points concerning them firmly in our minds. First, it has been well stated that many more of these devices have originated in Germany than in any other country; and, second, over and over again, it has been stated, that this or that device was installed after a serious accident had taken place in connection with the machine or one like it.

Now the German method of dealing with workmen's compensation and accident prevention differs from that in other countries in this, that it is administered through compulsory insurance in mutal associations composed of employers in the same general line of industry. It has been found in practice that these associations are alert to discover, recommend and even to enforce these means of accident prevention, and one feature of their superiority in this regard is that when a serious accident has happened in connection with a particular sort of machine, they are able to bring this to the attention of all others who are using such a machine in that general industry, and to recommend or even to enforce its adoption. By no other system has this so far been accomplished.

CARL M. HANSEN, *Manager, Inspection Department, Pacific Surety Company, San Francisco:* When I read the notice of this conference in a Chicago Insurance Journal, I immediately grasped the opportunity to learn something more on the subject of prevention of accidents; and, so to speak, jumped from San Francisco here in order to attend. I assure you that I already feel that I have been more than amply repaid for my efforts in getting here. Representing a company that considers its inspection and prevention work one of the chief departments, I am naturally vitally interested in the subject under discussion.

We have passed and just put into effect in California a workmen's compensation act, but, as the former speaker said, the prevention feature is conspicuous merely by its absence. It has been entirely eliminated in the new law.

I recollect some two years ago of having put the matter of accident prevention before our former governor but nothing more was heard of it. When, however, the present compensation act was up for passage I failed to get anyone interested enough on the subject to even speak or write on it. Of course I realize it is not too late yet; but to pass any workmen's compensation law without the preventive measure is to me identical with building a hospital under a cliff to care for the victims that we have deliberately thrown over. It appears that the difficulty is in not obtaining the requisite information before the laws are drafted and enacted.

Through the courtesy of our friend, Mr. Young, I inspected yesterday the South Works of the United States Steel Corporation; and, to be frank with you, it was a revelation to me. They are certainly doing fine work. We, of course, have enjoyed the illustrated lecture by Mr. Young to-day, and the only fault I find with it is that we are not the people it will do the most good. To really achieve any results, it must be brought before the general public, and here is where the United State Steel Corporation can do immeasureable good, by permitting their slides to be used in the different parts of the country for public lectures. Such action, I believe, would help largely to offset and correct the false impression that our large corporations are opposing preventive legislation. It would incidentally serve to stop the invention of trust-busting devices and divert our legislators' minds to more profitable channels.

A former speaker, Mr. Schwedtman, mentioned the fact that public lectures had already been in vogue for some time. I will here state that, to my knowledge, they have never been attempted on the other side of the Rockies. If the National Association of Manufacturers are conducting such lectures I would bespeak for California, and the West in general, their future consideration. I thank you.

WILL J. FRENCH, *Member, California Industrial Accident Board, San Francisco:* It is my pleasure to bring greetings from California to the American Association for Labor Legislation. I believe this is the first time the state mentioned has been represented at these conferences. The Governor of California—Hiram W. Johnson—is interested and in sympathy with progressive legislation, and especially with the work that comes within the scope of this organization.

The gentleman who preceded me—Mr. Carl M. Hansen—of the Pacific Surety Company of San Francisco, has told you of the workmen's compensation law in California which became effective on the first day of September. He truly states that, without accident prevention measures, the burden on all concerned will prove oppressive. As soon as we organized, departments were assigned the board members in order that the newly enacted law might be buttressed for the common good. It was recognized at once that one of these departments necessarily was that of accident prevention. I have the honor to represent that part of our work, and am here for the purpose of acquiring some of the knowledge obtainable on this very important subject.

The California Industrial Accident Board is ready at all times to confer with men and women on the problems that will confront us. That invitation is cordially extended to Mr. Hansen, as well as to all others, and the board would very much prefer to prevent all industrial accidents possible, by adopting legislation and agreeing upon rules in coöperation with those interested.

California has materially changed her liability law by abrogating the assumption of risk and fellow-servant rules, and modifying the section relating to contributory negligence. In conjunction therewith the last legislature adopted the workmen's compensation law, which enables employers and employes to come within its provisions on an elective basis.

It is not my purpose at this time to describe the new law. In passing, however, I should like to draw attention to the attitude of one of the large corporations of this country. Our chairman, Professor Seager, in his opening address, told us that the Standard Oil Company in New Jersey had declined to accept the provisions of their compensation law. In California one of our first acceptances was from the Standard Oil Company.

We believe we hold the record in California for many things. Recently the supreme court of the state has affirmed the decision of a lower court which gave heavy damages to an injured horse trainer, who was run down by a train operated by the Southern Pacific Railroad Company. The total paid, including principal and interest, was a little over $92,000. If that isn't a record, we would like to know what is. The railroad corporation was very much surprised at the sum allowed in the lower court and its surprise was not diminished by the action of the state's highest tribunal, especially as the Southern Pacific Company heretofore was unaccustomed to what may be termed progressive treatment!

Mr. A. J. Pillsbury, the chairman of California's Industrial Accident Board, recently visited the middle west and east on a tour of investigation. He met several of the gentlemen present, and to them, as well as to the Association generally, he sends his fraternal greetings. Our third member, Mr. Willis I. Morrison, is an energetic and able lawyer of southern California.

We are anxious to have the state's progress in dealing with workmen's compensation and accident prevention both steady and sure. While we are starting at the foot of the ladder, we expect to climb upward in a manner that will redound to this Association's credit and to California's benefit. I thank you for your courtesy.

II

ADMINISTRATION BY COMMISSIONS

Friday Evening Session, September 15, 1911.

Presiding Officer: Charles P. Neill
Commissioner, United States Bureau of Labor.
Washington, D. C.

THE INDUSTRIAL COMMISSION OF WISCONSIN

John R. Commons
Member, Wisconsin Industrial Commission.

The power to adopt measures for the protection of employes is a legislative power. The legislature must specify the things to be protected, and the courts construe their specifications strictly. If the law says that tumbling rods, set screws, shafting and all dangerous machinery must be safe-guarded, an inspector has no authority to order a buzz saw to be safe-guarded, because it is not like a tumbling rod, set screw, or shafting. The inspector has no discretion in extending the law beyond the kind of things specified.

But, while the inspector's discretion is limited in extent, it has considerable range in another direction. He has authority to determine how much or how little the things specified shall be protected. The legislature gives authority to each inspector to go into an establishment and to order changes to be made such as will, in his judgment, make the machinery safe. The degree of safety, in the last analysis, turns upon the discretion of the inspector who makes the examination. Power is practically delegated to him in carrying out a legislative act.

In foreign countries, especially on the continent of Europe, the method is different. There the legislature enacts a general rule or order requiring that all machinery and working places shall be kept safe and hygienic, and then leaves it to the administration officials to work out the details and to issue orders which shall determine how that law shall apply to different industries. So when, in France, parliament adopted a law requiring one day's rest in seven, it enacted a general law in a few words, and since that time the president of the republic through the Minister of Commerce and Labor, has been issuing orders prescribing the specific hours and days of labor in different countries.

But in America the legislature is supreme. The administration can issue only such orders as the legislature definitely lays down. Otherwise legislative power would be delegated, and, under our constitutions, with their dread of tyranny, this cannot be done. In order to get away from this restriction we have been compelled to create commissions, giving them power to issue orders similar in effect, but different in theory and procedure, to those issued in Europe. This came about first in the health department, and the Board of Health has power, within limits, to issue orders having the effect of law, as though issued by the legislature.

Following this has come the regulation of railroads and public utilities. Instead of enacting a law prescribing rates and services, the legislature merely enacts a general law requiring rates and services to be reasonable. A railroad commission is then created and authorized to investigate the facts and to discover and establish what is reasonable in each case. When the commission has published the rate, all parties interested can have a hearing. Everybody has an opportunity to protest and to present other facts, and then the order is finally issued and is binding. But any one dissatisfied can go into court and plead that it is unreasonable. If the court sustains him it will issue an injunction against the enforcement of that order.

It is the theory of this procedure that the commission has no discretion. It merely investigates and announces a fact. That fact is the reasonable thing the legislature had in mind, but did not have the time and means to discover.

The procedure conforms to the theory. Everybody affected by the order must have had a chance to tell the facts he knew, and the commission must give them due weight. Finally, the court protects him against any unlawful act of the commission.

In the state of Wisconsin one very important device has been introduced to protect the Railroad Commission before the state courts. This is the provision that when an order of the commission is contested in court and an injunction is asked for, the railroad company is prohibited from bringing in any evidence which it has not already presented to the commission. If it presents any new evidence in court which it did not give to the commission, then the court is required immediately to send the whole case back to the commission and to give to it the opportunity to consider the new evidence and to modify its decision. This has taken away from the state courts the arbitrary feature of the injunction, because the commission is in better position than the court to get the facts. The court is restricted to technical rules of evidence. The commission takes any evidence which is presented; it can send out its own investigators to get facts openly or in secret. It forms its own conclusions and issues its orders on the basis of more facts than the court admits. Then when the case comes into court, the facts as stated by the commission are *prima facie* true. The court, of course, cannot be restrained from going behind these facts, but the law makes the commission in effect the standing referee of the court in matters of investigation. The commission can make investigations along economic and sociological lines, a procedure not practicable for the courts. If they could have made these investigations, and were not tied down by technical rules, the injunction would not have been a menace to reasonable regulation. For we certainly can trust the integrity of the courts as much as the integrity of a commission. But here we have not merely a matter of integrity—we have a problem of expert investigation.

If, then, the facts thus acquired bring the case within the police power of the state the court sustains the commission. This has been the attitude of the Supreme Court of Wisconsin toward the Railroad Commission. The industrial commission law applies the same theory and procedure to the relations of capital and labor that the railroad commission law applies to the relations of public corporations and consumers.

One reason why labor questions in American states have not been acted upon according to the theory of a commission is the fact that the labor department is composed of a single chief and several deputies acting individually. The chief and each deputy have equal authority, and there are as many standards as there are deputies. The theory of the law is that the legislature has set the standard, and all the deputies are acting alike. But this theory is impracticable. There must be some leeway. It is the method of reaching a decision within this leeway that the constitution protects. "Due process of law" requires that decisions should be reached through public hearings after due notice so that all parties can have a voice. Then, after such thorough investigation, orders can be issued based on the findings.

But, properly, the investigation and decision should be made by more than one person. A single commission might be given the power to issue these orders, but our dread of tyranny revolts at this suggestion in matters affecting property interests. Consequently, the thing has worked itself out in public utility matters so that we have adopted a commission usually of three members in the states, while the Interstate Commerce Commission is composed of five or seven. The industrial commission law of Wisconsin provides for a commission of three. It lifts the matter up from the level of decisions based on the opinions of a number of factory inspectors and concentrates it in the hands of three men, giving them power to get all the facts. At the same time the legislature lays down the general rule that every employer shall furnish to his employes the necessary protection to life, health, safety and welfare. This places the obligation upon the employer. He must maintain his place of employment and its premises so that the employe shall not incur the risk of accident. He must furnish safety devices and safeguards. He must adopt methods and processes which shall be safe for the employes.

But it is not left to the employer to tell what are those safe methods and processes, nor is it left to the factory inspectors. To the Industrial Commission is assigned the duty of investigating and ascertaining what safety devices and safeguards, what means, methods and processes, are best adapted to render the factory safe. Having ascertained what they are, the commission issues an order prescribing that they shall be installed for each factory or each class of factories. This, then, is the lawful order which all are required to observe.

The situation regarding prosecutions now takes on a different aspect. Hitherto, if a factory inspector went into a factory and found a machine not protected, he gave orders to the manufacturer to put on a protective device, and allowed, say, thirty days. If after thirty days the manufacturer had not complied, the inspector brought the matter to the justice's court. The justice had before him the factory inspector as prosecuting witness and the manufacturer as defendant. The justice perhaps immediately asked the inspector how he knew whether or not the machine was safe, or whether the device would make it safe, and went on to say that the manufacturer perhaps knew as much about it as the inspector. The case might not even go to the jury to decide the facts. The judge might say "case dismissed" on the ground of insufficient reason.

The great difficulty of factory inspection laws has been the prosecutions. Under the new Wisconsin law the question of reasonableness or necessity cannot be raised in the justice's court. The only question that can come up in the lower court is: What was the standard set by the commission for that machine? and the question for justice or jury then becomes: Did the manufacturer put on the safety device or not? One cannot raise the question in that court as to whether that is the right kind of a device. If he wants to raise that question, he can do it in two ways: (1) Appeal to the commission on the ground that the order is not adapted to his factory. The commission must then hold a hearing and decide upon it. (2) Then if he is not satisfied, he cannot go back to the justice's court, but must prosecute the commission itself. There is but one court in the state where this can be done, the court of Dane County at the capitol of the state. This action is given precedence over other actions of a different nature. It is carried thence to the Supreme Court. So the question of prosecution takes on an entirely different aspect. Justices' courts now cannot take up the question of the validity of the order. They are restricted to the question of facts.

Furthermore, the factory inspector does not issue any orders. He merely notifies the commission, which in turn notifies the employer and issues an order, if necessary. Thus the inspector is both supported by standards well known throughout the trade, and shorn of that petty authority that sometimes irritates. The manufacturers also are in a better position, because they have a voice in making the standard through public hearings, and they have themselves taken part in deciding on what is to be adapted to their individual circumstances. The procedure is the same as when the Railroad Commission established the measure for 1,000 cubic feet of gas. The engineer of the commission drew up his proposed orders as to what 1,000 feet of gas should be, how rapidly it should flow, how the instruments should be constructed to measure it, what candle power it should yield, and so on. This tentative measure was then sent over the state, and to outside experts, and the gas manufacturers came to Madison for their hearing. As a result of this hearing, two standards were established: one for large cities and one for small cities. So it would be in standardization of safety and sanitation. Some qualified person, acting under the commission, would send out his tentative specifications, providing for what he thought was necessary to make the industry safe, and, after other manufacturers, employes and others interested had examined the schedule, they would come together and discuss the matter with the commission. When the proper thing was decided upon it would be adopted as a rule and be put into effect.

In the public utilities law, the legislature simply adopts the rule that rates shall be "reasonable." In labor legislation we have a little different situation. The legislature may enact a rule that factories or places of employment shall be "reasonably safe," but reasonably safe, according to law, means just ordinary safety that any employer would exercise without taking extra care. That would not be a high standard for legislation. It would not make it possible for the commission to get the same kind of reasonable regulation as they get in railroad rates. Here it is not an ordinary railroad rate, it is something more. The definition for safety which appears in this law is as follows: *"The term 'safe' or 'safety' as applied to an employment or a place of employment shall mean such freedom from danger to the life, health, or safety of employes or frequenters as the nature of the employment will reasonably permit."* We are required to have the word "reasonable," which in law means due consideration of all the facts in the case. Otherwise, the law is unconstitutional. But we need something more than ordinary safety. If any new methods of safety have been devised and are practicable, and therefore reasonable, the commission can require all employers to put them in, for they are as reasonable as the nature of the employment will permit. In other words, it is possible by this definition of safety to improve the standards and to secure more than ordinary safety.

The significance of this provision consists in this fact: with the workmen's compensation law which has been enacted in this state and with the taking away of the defenses of the employer in liability suits, the expense of caring for accidents will be more or less enhanced. The way to counteract this is to prevent accidents, not merely in those factories which come under the compensation law, but also in those which do not. Consequently, administrative orders for improving the safety of employment are a necessary corollary of the workmen's compensation law. Otherwise, the expense of compensation would be so great that the law might break down.

Both employer and employe are required to observe these orders of the commission. The requirement upon employes is a new feature arising from the fact that the employer under the new compensation law must pay damages to the employe who injures himself as well as to the employe who is injured through the negligence of a fellow employe. The old doctrine held that, if a person injured himself, (and everybody could do as he pleased with himself) the employer need not pay for the injury. The question which now arises is, can the employe be compelled to make use of the safety devices which are furnished? Under the old liability law, if a molder let melted iron fall on his feet, that was not the fault of the employer. He could not bring suit against the employer and get damages for his burned feet, but under the compensation law he can. The employer will be required to pay him 65 per cent of the loss of wages for injury which he has suffered. Now, the employer would naturally want that man to wear Congress shoes that could be quickly snatched off, and he might even furnish them to him at cost. The question arises, can that man be compelled to wear those protective shoes? This is an open question and is not decided. It is attempted, however, in this law to come as near to it as possible. There are two points: (1) Employes can be required to refrain from destroying devices which the employer puts in. (2) Employes can be punished for preventing another employe from using safety devices. The other question, whether he can be punished for refusing to use them himself is an open one. The law reads: "No employe shall remove, displace, damage, destroy or carry off any safety device or safeguard furnished and provided for use in any employment or place of employment, nor interfere in any way with the use thereof by any other person, nor shall any such employe interfere with the use of any method or process adopted for the protection of any employe in such employment or place of employment or frequenter of such place of employment, nor fail or neglect to do every other thing reasonably necessary to protect the life, health, safety or welfare of such employes or frequenters." The commission would be called upon to issue a rule requiring the molder to wear boots, and then the question would arise, would the courts sustain this order? It certainly is reasonable, from the standpoint of workmen's compensation, that employes shall take care of themselves and thus protect the employer in his new duties of protecting them.

Another feature is the control which the commission has over the construction of new factories. New buildings must be cared for as to safety and sanitation, the same as old ones. The law says that "no employer or other person shall hereafter construct or occupy or maintain any place of employment that is not safe."

There are three kinds of orders dealt with in the law: (1) general orders applying to all manufacturers or all persons of the same class throughout the state; (2) special orders applying only to one factory, one establishment, or one person; (3) local orders, or orders of similar and conflicting nature issued by municipal councils, boards of aldermen or local boards of health. It is provided that if the commission standardizes an industry and issues its orders, any rule of a local board in conflict therewith shall be void. Meanwhile the local board can go ahead and issue their orders, the employer being protected by the right of appeal to the state commission to determine whether there is a conflict or whether the local order is unreasonable. This is necessary in order to have uniformity of standards throughout the state. It has been criticized as a violation of home rule, but it is really a protection for local boards of health and municipal councils, because their orders are subject to court review and injunction. The law simply provides that if an employer objects to any prohibition in a local rule, he is not allowed to go first into court, but must first go to the commission. Then if not satisfied with the commission's orders, he can go into the Dane County Court, and then to the Supreme Court. Consequently, uniformity of all orders is approximated and the local boards are protected.

The practical outcome of this new procedure should be a progressive and accurate adjustment of factory inspection to the changes in industry and the new risks that accompany modern industry. Hitherto, when it was discovered that the buzz-saw or the set screw had been omitted from the law, it was necessary to get together the Federation of Labor, the Women's Trade Union League, and all the friends of labor, to organize them into a lobby and to go down to the legislature in order to get the words "buzz-saw" and "set screw" inserted in the law. Now it is only necessary for the Industrial Commission to show that these things are dangerous and the protection practicable. The difference is obvious. It now is practicable in Wisconsin, without further legislation, for the Industrial Commission to adopt and enforce the admirable rules of the Massachusetts Board of Boiler Rules, if they are found to be adapted to Wisconsin conditions. So also, the commission may learn from the novel work of "medical" inspection of the Massachusetts Board of Health and the New York Department of Labor, and may adapt to Wisconsin, so far as practicable, the best that other states and countries have been able to work out for safety and sanitation of work places.

This law goes further, with the object of centering in one body all the relations of employer and employe, just as the Railroad Commission centers in one body all of the relations of the public utility corporations and the consumers. Everything that comes up between the two interests is under the jurisdiction of one commission. This includes, for example, everything relating to bargains between employer and employe. The law abolishes the Board of Mediation and Arbitration and turns over that work to the commission with the aid of temporary local boards.

The same is true of unemployment. The commission has power to establish and conduct free employment agencies, and to supervise private agencies. It goes further with reference to directing apprentices and minors into promising employments. It takes up matters of industrial and agricultural training, and may establish offices in the state.

The legislature has not, however, given to the Industrial Commission any authority in the execution of the child labor, woman labor, and other labor laws similar to its authority in the factory inspection laws. The new ten-hour law for women, with its requirement of a full hour for dinner, has already pointed plainly to the need of such authority. Many cases have come up, especially in restaurants, where it seems that a public hearing would establish the fact that a different schedule of hours within the ten-hour limit would be more "reasonable" than the rigid schedule of the legislature. Perhaps, if the new law works well in safety and sanitation, its principles and procedure may be extended by a future legislature to additional subjects.

THE MASSACHUSETTS BOARD OF BOILER RULES

Joseph H. McNeill
Chairman, Massachusetts Board of Boiler Rules.

Many arguments can be advanced for and against the commission form of government. A discussion regarding the necessity for the creation, existence or continance of a certain form of commission, such as the Board of Boiler Rules of Massachusetts, cannot be entered into intelligently, unless the whole situation is thoroughly understood.

The Massachusetts Board of Boiler Rules is, primarily, a legislative commission, and was created by Section 24, Chapter 465, Acts of 1907, reading as follows:

> "The governor, within thirty days after the passage of this act, with the consent of the council, shall appoint a board of five persons, to be known as the Board of Boiler Rules, of whom the last four shall be appointed to serve as follows:—Two for a term of four years and two for a term of three years each. At the expiration of office their successors shall be appointed for terms of three years each . . . . . The board shall be constituted as follows:—The chief inspector of the boiler inspection department of the district police, who shall be its chairman; one member representing the boiler using interests; one member representing the boiler manufacturing interests; one member representing the boiler insurance interests; and one member who is an operating engineer."

This law defined the duties of the board by stating:

> "It shall be the duty of the board of boiler rules to formulate rules for the construction, installation and inspection of steam boilers, and for ascertaining the safe working pressure to be carried on said boilers, to prescribe tests, if they deem it necessary, to ascertain the qualities of material used in the construction of boilers; to formulate rules regulating the construction and sizes of safety valves for boilers of different sizes and pressures, the construction, use and location of fusible safety plugs, appliances for indicating the pressure of steam and the level of water in the boiler, and such other appliances as the board may deem necessary to safety in operating steam boilers; and to make a standard form of certificate of inspection."

In 1909 the duties of the board were enlarged by the following addition to the above law:

"The board of boiler rules shall hold public hearings on the first Thursday in May and November of each year, and at such other times as the board may determine, on petitions for changes in the rules formulated by said board. If the board, after any such hearing, shall deem it advisable to make changes in said rules, it shall appoint a day for a further hearing, and shall give notice thereof and of the changes proposed by advertising in at least one newspaper in each of the cities of Boston, Worcester, Springfield, Fall River, Lowell and Lynn, at least ten days before said hearing. If the board on its own initiative contemplates changes in said rules, like notice and a hearing shall be given and held before the adoption thereof. Changes made in the rules which affect the constructions of new boilers shall take effect six months after the approval of the same by the governor; *provided, however,* that the board may, upon request, permit the application of such change in, or additions to rules, to boilers manufactured or installed during said six months. When a person desires to manufacture a special type of boiler the design of which is not covered by the rules formulated by the boiler rules, he shall submit drawings and specifications of such boiler to said board, which, if it approves, shall permit the construction of the same."

The laws reads:

"The rules so formulated shall be submitted to the governor for his approval, and when approved shall have the force of law, and shall be printed and furnished to those requesting them by the boiler inspection department."

The law, as above quoted, shows clearly that the work of the Board of Boiler Rules is legislative. The administrative power is vested in the Boiler Inspection Department, the law stating:

"The boiler inspection department of the district police shall enforce the provisions of the preceding sections and such rules as shall be promulgated by the board of boiler rules with the approval of the governor."

There is no provision by which the Board of Boiler Rules or the Boiler Inspection Department can waive any of the rules. The Boiler Inspection Department is closely allied with the Board of Boiler Rules, due to the fact that the chief inspector of that department is chairman of the board; and this alliance is of great assistance and strength in connection with the whole scope of the work, as the interpretation of the rules is made by the chief inspector. The board also acts in an advisory capacity on matters that are not positively covered by the rules. The board takes zealous interest in the proper enforcement of the laws and rules, and in the welfare of the Boiler Inspection Department.

In Massachusetts, three methods were available to establish boiler regulations: First, by direct legislation. The example we had in the United States laws on these matters, was sufficient for those interested in the ultimate success of the work, to avoid advocating any such method. The rules that apply to vessels coming under the jurisdiction of the Department of Commerce and Labor are enacted by Congress, and it is a well know fact that the United States rules by which the working pressure allowable on steam boilers is calculated are entirely inconsistent with modern practice. The only solution as to how this condition is allowed to continue is, that ponderous legislative machinery is required to be put in motion to bring about any change in such rules. The Massachusetts legislative committee to whom bills containing boiler rules were referred, fully realized that they were not sufficiently familiar with this special technical subject, to take the responsibility of passing upon and enacting into law such matters.

The second method available was, to give the State Boiler Inspection Department authority to make rules. From 1895 to 1902 the boiler inspection law stated that,

> "The chief of the district police is hereby authorized to adopt such rules and regulations, to be approved by the governor, as may be necessary to properly enforce this act."

The only use made of this authority was that, in 1899, brief rules, which applied to appurtenances of boilers, were adopted by the state department.

The third method was, to establish a separate board authorized to do this work. This, unquestionably, was the best method, as the various interests affected by such rules and regulations are represented on the board, and are therefore in a position to bring before the board, through their representatives, all matters affecting their interests. By having a board authorized for such special duties, the rules can be kept abreast of the times by changes and additions to be made at reasonable intervals, as additional experience and more modern engineering practice show to be advisable.

A foundation was laid for the work of the board by laws enacted many years prior to 1907. I will go back to 1845 and briefly state the history of steam boiler legislation in Massachusetts, to illustrate the absolute need which existed in 1907 for more rigid laws to safeguard human life and property.

In 1845 the legislature enacted a law regulating the use of steam engines and furnaces. Section two of that law provided that the mayor and aldermen of a city, or the selectmen of a town, had authority to prescribe such *rules, restrictions and limitations* as might in their judgment be found necessary; therefore, sixty-six years ago, the legislature of Massachusetts authorized the making of boiler rules. In 1849 "An Act to Prevent the Explosion of Steam Boilers" was passed. This law required a fusible plug in steam boilers, and the penalty for violation was a fine not exceeding one thousand dollars. In 1850 the law relative to fusible plugs was amended by adding the words, "And for this purpose it shall be lawful to use Ashcroft's Protected Safety Fusible Plug". In 1859 the law gave city or town officials, *or any person by them authorized,* authority to examine steam boilers.

These laws were, to all intents and purposes, a dead letter, and continued so until 1893 when members of the National Association of Stationary Engineers in Massachusetts, being vitally interested in safeguarding human life, were instrumental in securing the passage of a law to appoint a temporary inspector in the inspection department of the district police. The duties of said inspector were to inspect uninsured steam boilers and their appurtenances, and to inquire into the ability and competency of the engineers in charge thereof. The work of this inspector brought to light conditions which fully warranted the passage in 1895, of an engineers' and firemen's license law and a boiler inspection law, the inspection of boilers to be made by state inspectors whose appointment was provided for. Certain classes of boilers, including boilers under the periodically guaranteed inspection of insurance companies, were exempted from state inspection.

On March 20, 1905, a steam boiler, 6 feet in diameter, exploded at Brockton, Mass. The longitudinal joints of this boiler were of lap-joint construction. The cause of the explosion was a fracture on the shell plate at the longitudinal joint; this defect is commonly called a *lap-crack*. The explosion of the boiler, collapse of the building and fire, killed 58 and injured 117 persons. The property loss was estimated at $230,000. Public feeling ran high, and, while all kinds of propositions were made to prevent by a law a repetition of this disaster, the only immediate effect of the agitation was, the passage of an act which increased from two, to five dollars the state fee for internal inspection of a steam boiler, and which required the boiler insurance companies to make a report to the state department of every boiler inspected by them, but did not give the state department any authority over insured boilers. Up to this time, only two companies were authorized to inspect and insure steam boilers in Massachusetts. An amendment was made to the insurance laws, permitting general liability companies to enter the boiler inspection field.

In 1906 a law was enacted authorizing the governor to appoint one of the ten members of the boiler inspection department as chief inspector, this law specifying that,

> "Said chief inspector shall have supervision over the members of said boiler inspection department in order to secure the uniform enforcement throughout the Commonwealth, of all acts relative to the inspection of boilers and the examination of engineers and firemen."

Section two of this act reads as follows:

> "As soon as practicable after the passage of this act the civil service commissioners shall hold an examination to determine the qualifications of applicants for the position of said chief inspector. The commissioners shall certify to the governor the names of the three persons receiving the highest percentage on such examination, and the percentage obtained by each, and the governor shall appoint one of said three persons as chief inspector of the boiler inspection department.

On December 6, 1906, a boiler 6 feet in diameter, exploded at Lynn, Mass. The cause of this explosion was identical with that of the Brockton explosion, namely, a lap-crack. Fortunately, no lives were lost, but several persons were seriously injured. The property loss was estimated at $422,000. The official report on this explosion was transmitted to the legislature by the Hon. Curtis Guild, governor, and on January 3, 1907, he included in his inaugural address a strong statement regarding the need of better boiler inspection laws.

Thirteen bills affecting boiler inspection were introduced into the legislature in January, 1907. Some of these bills contained drastic and unreasonable proposals. The committee to whom all of these bills were referred, held several public hearings and, after careful consideration and consultation with prominent boiler users, boiler manufacturers, insurance companies and operating engineers, drafted a bill which embodied the most practical features of the boiler inspection law of 1895, and the most progressive features included in the bills which had been submitted to them. The bill drafted by the committee passed the legislature without opposition. This law repealed all previous conflicting laws and provided for the appointment, by the governor, of a board of five, to be known as the Board of Boiler Rules. On July 5, 1907, the following appointments were made:

Joseph H. McNeill, Chief Inspector, Boiler Inspection Department, Chairman.

John A. Stevens, M.E., Representing Boiler Using Interests.

Frederic H. Keyes, M.E., Representing Boiler Manufacturing Interests.

Robert J. Dunkle, Representing Boiler Insurance Interests.

William M. Beck, Representing Operating Engineers.

In March, 1910, Mr. Frederic H. Keyes resigned, and was succeeded by Mr. Bartholomew Scannell; otherwise the personnel of the board remains unchanged.

I have considered it necessary to give an outline of the history of boiler legislation in Massachusetts, so that the whole situation regarding the work of the Board of Boiler Rules will be clearly understood, since to merely state that a law was enacted creating a board to do this work, without showing the conditions which led up to such a step being taken, would be very indefinite.

The first meeting of the board was held on July 15, 1907. The intense interest and resultant legislation affecting boiler inspection were caused by explosions of lap-joint boilers. The drafting of rules to limit the pressure on all steam boilers, especially lap-joint boilers, was the most important feature of the work and received first consideration. A three-page circular, issued August 30, 1907, contained the original rules.

The policy of the board from the beginning has been to seek information pertaining to the material, design, construction, installation, inspection and operation of steam boilers and their appurtenances, from every available source throughout the United States and foreign countries, and to be receptive to all progressive ideas submitted, without placing approval on any special appurtenance; but when, in their judgment, certain appurtenances are considered unsafe, to make rules prohibiting their use.

In October, 1907, the board sent out circular letters requesting mechanical engineers, insurance companies and boiler manufacturers to furnish specifications embodying their best practice in steam boiler construction, and fifty-one specifications, containing a large fund of information, were received. Tabulations were made, and the basis of the rules governing the construction of Massachusetts Standard boilers was taken from the best features contained in the specifications. The rule governing boiler plate and rivet steel is the specification adopted by the American Society for Testing Materials.

The board made tests to ascertain the strength of circular furnaces and flat surfaces. These tests are fully described and illustrated in their report. The important question of using the yield point of steel in calculating the pressure to be allowed on boilers had been advocated, and in June, 1909, the board issued a circular letter asking for an expression of opinion on this matter. Two hundred and thirty-seven copies of the letter were sent to steel manufacturers, mechanical engineers, mechanical publications, federal, state, municipal and insurance company inspectors of boilers, boiler insurance companies, and boiler manufacturers. The concensus of opinion expressed was against using the yield point as proposed, and no change was made in the rules regarding that matter.

Each and every member gives careful consideration to all matters, and while details were looked at from different viewpoints, it should be understood that, after a thorough discussion and consideration, the rules issued by the board are agreed upon as a unit.

The rules governing the construction of MASSACHUSETTS STAN-

DARD boilers took effect May 1, 1908, and the Boiler Inspection Department enforced these rules in an impartial manner. Opposition to the work of the board was shown by six bills being submitted to the legislature in January, 1909. The passage of any one of these bills, in its original form, would have been a step backward and injurious to the work of the board. The outcome of all the effort thus made to weaken the work was, that the committee on mercantile affairs reported a bill, which was enacted May 14, 1909. The most important feature of this act is that which provides for a public hearing before a change or addition can be made to the rules. This provision of the law greatly strengthens the whole situation.

On August 2, 1909, of its own initiative, the board held a public hearing on contemplated changes in the rules. The modifications and additions to the rules, as presented at the public hearing, were approved by the Hon. Eben S. Draper, governor, on August 5, 1909, and a complete edition of the revised rules was issued. There has been no change or addition to the rules since August 5, 1909.

Additions and amendments were made to the original rules from time to time, and issued in pamphlet form, as follows:

September 18, 1907,	a	pamphlet	of	10	pages,
November 19, 1907,	”	”	”	12	”
January 9, 1908,	”	”	”	24	”
March 24, 1908,	”	”	”	42	”
June 9, 1908,	”	”	”	43	”
October 1, 1908,	”	”	”	47	”
August 5, 1909,	”	”	”	52	”

Fifteen thousand copies of the last edition of the rules have been distributed, not only in Massachusetts, but all over the world.

The board has authority, under the law, to approve special types of boilers; but up to this time no such approval has been given. The board has authority, under the rules, to approve facsimiles of boiler manufacturers' stamps, locations of stamps, special material and special longitudinal joints. A circular letter issued by the board, dated July 14, 1911, comes under the latter heading, and applies to welded joints. The board has no authority to issue orders to the Boiler Inspection Department nor to the public. The total number of meetings held by the Board to date is 130, an average of a meeting every 12 days.

Included in the important results of the work of the board are;—fixing a limit of pressure on all boilers; reduction of pressures allowed on lap-joint boilers; the use of many old lap-joint boilers discontinued; the bringing of lap-joint boilers, over thirty-six inches in diameter, into Massachusetts, stopped; the construction, for installation in Massachusetts of lap-joint boilers over thirty-six inches in diameter, stopped; the establishment of a high standard for material, design and construction, of boilers.

The board has never contended that the enactment of laws and rules would prevent a steam boiler from exploding; but we do contend that the strict compliance with rigid laws and rules governing the material, design, construction, installation, inspection and operation of steam boilers and their appurtenances will reduce to a minimum the ratio which the number of boiler explosions will have to the number of boilers in use.

Three steam boiler explosions have occurred in Massachusetts since October 1, 1907; one in December, 1907, caused by a lap-crack (one person killed); one in December, 1910, caused by a lap-crack (several persons injured); and one in December, 1910, caused by the engineer screwing down the safety valve to two hundred and twenty-five (225) pounds pressure to the square inch (seventeen persons killed). The pressure allowed by a state inspector on this latter boiler was seventy (70) pounds per square inch, and Hon. Charles E. Burke, Justice of the District Court of Central Berkshire, included in his report of the inquest, the statement:

> "And I am unable to find that there was any fault whatsoever in the work of the State Inspection Department relative to this boiler. On the other hand, since I have learned the facts in this case and the methods pursued by this Department, I am inspired with confidence in its thoroughness and efficiency and have words of commendation only for it. I am informed that out of the 39,572 boilers inspected by the Department since 1893, this is the only boiler that has exploded."

State inspectors of boilers qualify by civil service examination. The present number of state inspectors is nineteen. Recent legislation provides for five additional inspectors.

Insurance companies' inspectors of boilers qualify by examination before a board of three state inspectors of boilers. The present number of qualified inspectors, that is, inspectors holding certificates of competency, employed by the ten insurance companies authorized to inspect and insure boilers in Massachusetts, is eighty-four. Their work in connection with the boiler inspection law and the rules formulated by the Board of Boiler Rules is under the supervision of the Chief Inspector of the Boiler Inspection Department, to whom the insurance companies forward reports of all inspections made in Massachusetts, except boiler shop inspections. All Massachusetts standard boilers are required to be examined during construction, inspected and stamped, MASS. STD. upon completion at the boiler shop, by an inspector of the Boiler Inspection Department or an inspector holding a certificate of competency; and the inspector's certificate of boiler shop inspection is included with the boiler manufacturer's data report forwarded to the Chief Inspector of the Boiler Inspection Department before the boiler leaves the boiler shop.

There are upwards of twenty-four thousand steam boilers in Massachusetts, which are subject to the provisions of the boiler inspection law and the rules formulated by the Board of Boiler Rules.

From May 1, 1908, to September 1, 1911, four thousand eight hundred and thirty-eight (4838) Massachusetts Standard boilers have been constructed for installation in Massachusetts, other states, United States possessions, and foreign countries. This work, the foundation of which is the protection of human life, fully justifies the creation, existence and continuance of the Board of Boiler Rules of the Commonwealth of Massachusetts.

The boiler rules enacted by the city of Manila, Philippine Islands, are practically the 1908 Massachusetts rules. In June, 1910, Detroit, Michigan, enacted a boiler inspection ordinance which provided for the appointment of a board of boiler rules, and the adoption of the 1909 Massachusetts rules. On June 14, 1911, the State of Ohio passed a boiler inspection law. This law was drafted from the Massachusetts law, and provides for a board of boiler rules. The American Society of Mechanical Engineers has placed in the hands of a committee of seven, selected from their 3978 members, authority to establish for the society a standard for boiler construction. I take pleasure in stating that Mr. John A. Stevens, one of my associates on the Board of Boiler Rules, has been selected as chairman of this committee.

I respectfully submit, for your careful consideration, two recommendations:

1. That the United States Government establish by law a standard for the physical and chemical properties of steel entering into the construction of steam boilers.

2. That the United States Government prohibit by law the further construction, over a certain specified diameter, of boilers having longitudinal joints of lap riveted construction.

I appreciate the honor of your invitation to address this convention. His Excellency, Eugene N. Foss, governor, who has shown his interest in our work, heartily endorsed my coming here as Chairman of the Board of Boiler Rules, to represent the Commonwealth of Massachusetts.

SAFETY INSPECTION IN ILLINOIS

EDGAR T. DAVIES
Chief, Illinois State Department of Factory Inspection.

The subject assigned to me suggests, first that there are certain safety standards prescribed by the laws of the different states in reference to the protection of employes in factories, mills and workshops, and this is of course true, as we all know. The subject as stated also suggests that adequate safety standards may not be secured through state inspection alone, which is also true.

The safety standards which the statutes of the various states seek to fix are as various as they are numerous. It seldom happens that the laws of any two states are exactly the same with reference to what must or must not be done for the safety and welfare of employes, and the great variety of subjects covered by modern, progressive legislation for the benefit of workers renders it well nigh impossible to classify the various laws under particular heads and deduce therefrom any definite standards of safety which have anything like a uniform operation throughout the country.

Suffice to say that, during the last few years, laws have been passed in many states, relative to the quality of air and air space, cleanliness, closets, colored and corrugated windows, drainage, dust, drinking water, expectoration, floor space, humidity, light, over-crowding, lunch rooms, temperature, time for meals, toilet rooms, sanitation generally, seating, vaccination, ventilation, and the guarding of dangerous machines and places.

As a state inspector, my experience has demonstrated that the arbitrary imposition of rules of law will not, in itself, produce satisfactory standards for the safety and health of employes in factories, mills and workshops.

Given a certain set of undesirable conditions in a factory the promulgation of a body of rules to remedy the evils which exist, will, in itself, produce anything but satisfactory results. To illustrate, it is impossible to Christianize a people by laying down an arbitrary code of rules by which these people are required to live and govern themselves, or in default thereof be punished. This method of dealing with the situation is a treatment of the symptoms rather than the disease. On the other hand, if the State, through its inspectors, can bring both employer and employe a knowledge of what conditions should exist in a modern factory or mill, and by means of sympathetic coöperation and education, set up for employer and employe, a factory ideal, to which both should aspire, the results will be, that the factory will be conducted in such a manner that the rules will result from the conduct of the factory, just as ethical rules result from the conduct of men, who have accomplished more nearly than their fellows the ideals for which we are all striving. The arbitrary imposition or enforcement of rules and laws, is always resented by the American citizen, either in the factory or out, and, while a rule which is enacted into law and therefore backed by the authority of the sovereign State, is perhaps as effective a method as can be devised under our system of government, yet the observations which I have made, are designed to emphasize the importance of coöperation and of education of both parties to the labor contract, as to what are ideal factory conditions. This we must do if any substantial results with reference to safety standards are to be obtained through state inspection.

While the states have admittedly made commendable progress in recent years in legislation to establish safety standards in factories, mills and workshops, at the same time the ideals of certain large manufacturers in our larger industrial centers have impelled them to voluntarily adopt regulations for the government of their institutions, which, in some respects, are an improvement on the laws of the state in which they live and carry on their business. And this voluntary action on their part illustrates again the point we have already made, that education is often more important in arriving at proper safety standards than legislation. The modern, progressive manufacturer is beginning to learn as a matter of fact that, viewed strictly from a point of industrial economics, every reasonble measure should be adopted to promote the safety, health and welfare of his employes, because his experience has demonstrated that under such conditions he will secure a larger increase in efficiency, a better quality of workmanship in the manufactured article which he produces, and a general improvement in the relations which exist between the employer and employe. These will result in a spirit of harmony and contentment which will go a long way toward preventing labor trouble and wage disputes, and other disturbing conditions which have heretofore been all too common in our industrial life.

The great and ever increasing hazards of modern industry are the result of the same old spirit of selfish greed, which has existed in the world since its beginning. In the early days of the race life meant a struggle between man and man for physical supremacy. When the survivors of this rude age finally established for themselves a form of government, they then applied their energies to the permanent establishment of their own institutions to the exclusion of all others, and one nation arrayed itself against another in brutal war, with the selfish purpose of destroying any people who interfered with their own selfish ends; and in those days the greatness of the nation depended upon the number and efficiency of its standing army and equipment of its navy, and countless thousands were sacrificed on the altar of ambition.

This spirit of national self-aggrandizement was also apparent in the individual lives of the men who were prominent in the history of the nations in which they lived, and men employed their talents in the making of kings and the ruling of parliaments, and the development of the arts and industries was left to those few unselfish spirits who cared neither for great wealth nor for worldly honors.

The devastation and ruin wrought by this selfish spirit of nation and individual seems to us now, as we look back upon it, inexcusable and barbarous, but let us pause for a moment and inquire whether the statement which we have made, to-wit:—that the same selfish spirit of greed is with us today, is not true, and that it is merely manifested in another form more devastating in fact than ever before.

In this day and age of the world the best intellects of the time are being devoted to the development of commerce and industry, and the result has been a progress in the means of transportation and in the industrial arts, which is indeed miraculous.

In this process, however, of pitting mind against mind in the devolopment of modern industry, competition has arisen, which is savage and brutal in its character and which resembles in all essential particulars the spirit which actuated the armies of the middle ages in fighting for national supremacy. It is again the old, never ending proposition of the survival of the fittest, with the result that many industrial institutions have plunged along in their mad course with only one object in view, to-wit: to outstrip competitors, produce the largest output, and make the most money, regardless of cost in brain, health, safety and energy of the men who do the work.

The subject of safety standards is indeed a difficult as well as technical one. But inasmuch as the subject has been assigned to me, I hope it will not be considered immodest on my part to announce that I consider the safety standards fixed by the State of Illinois to more nearly approach the ideal for safety and health standards, than the laws in any other state in the Union; and, after careful study of the statutes of other states I feel justified in saying that the Illinois laws, which I am more pleased to call the Illinois Idea, are more specific in their character, broader in their scope and more practical in their application than any other laws in the country on the subject.

But these laws, admirable as they are, still fall short of the ideals which our experience and training have set before us, and which I believe to be entirely possible of attainment. And this with due regard to industrial progress and efficiency.

In discussing what should be the standard, in passing I would say that Illinois has already provided for the major portion of the suggestions I shall make, but I shall depart from a discussion of mere statutory requirements for the purpose of describing as completely as possible my own ideas of safety, health and comfort standards which could be fixed through state inspection.

We have in this state the following laws charged to the Department of Factory Inspection for enforcement:

A very broad and effective child labor law.

A law regulating the manufacture of garments and wearing apparel.

A law regulating the manufacture of ice cream and butterine.

Metal polishing and grinding machinery law.

Structural iron work on buildings and the overseeing of and issuing of the necessary orders for the protection of life and limb of employes engaged in the construction and erection, repairing or alteration of building, bridges and viaducts.

A law prohibiting the working of females for more than ten hours a day in mechanical and mercantile establishments, factories, laundries, hotels, restaurants, telegraph or telephone establishments or offices thereof, or in any place of amusement or by an express or transportation, or public utility, business or by any common carrier or in any public institution, incorporated or unincorporated.

An act to promote the public health by protecting certain employes from the dangers of occupational diseases. This law is the first of its kind in the United States.

Illinois also has a new Workmen's Compensation Law, passed by the last session of the general assembly. We also have the law which more clearly deals with the subjects now under discussion by this Association, to-wit: The act to provide for the health, safety and comfort of employes in factories, mercantile establishments, mills and workshops.

This law deals with and has a provision applying to every portion of a mercantile establishment or factory, mill or workshop, from the basement where the boiler rooms are located, then on to the engine room and the machinery of the plant with regard to its operation and control, and the stairways leading from floor to floor, the wash rooms, toilets, sanitation, ventilation, drainage, proper temperature, fumes, gases and odors, fire protection, elevator shafts, and elevator control and sustaining power of the walls and floors; and the further providing for, safeguarding, and protecting, all power driven machinery, including all saws, planers, wood shapers, jointers, sand paper machines, iron mangles, emery wheels, ovens, furnaces, forges and rollers of metal, all projecting set screws on moving parts, all drums, cogs, gears, belting, shafting, fly wheels, flying shuttles and hydro-extractors; laundry machinery, mill gearing and machinery of every description; all systems of electrical wiring or transmissions; all dynamos and other electrical apparatus and appliances; all vats and pans, and all receptacles containing molten metal or hot or corrosive fluids; dangerous passageways, defective machinery, the prohibition or removal of safeguards; the law requires also systems of speaking tubes or colored signals between the various rooms in the plant and that in which the prime mover is located; and provisions for proper lunch places, exits and entrances, proper light, proper disinfecting, air space and separate toilet facilities for female employes. The reporting of fatal and non-fatal accidents is also required. Proper notices are provided for employer and employes and we have had a digest of the laws provisions in the form of a shop notice printed in fourteen languages.

It was no easy task to frame this law; after six years of wide research of this subject in this country and abroad, and the introduction of bills upon the subject at three consecutive sessions of the legislature, the visitation of numerous establishments and many museums of safety devices, such as those of Munich, Paris and Vienna, which was of inestimable value to me, Senate Bill 500 was introduced and considered by the 45th general assembly.

The publicity which resulted from the introduction and discussion of this bill resulted in the public press awaking to the needs of the hour. The subject became one of such broad interest that the general assembly, after the defeat of the bill, which was not on roll call but smothered in the committee, realizing that the subject was one needing prompt and careful attention, passed my resolution authorizing the governor to appoint an industrial commission, to take up the consideration of the entire subject, with the final result that the next general assembly passed an exceptionally beneficial law.

It was my pleasure to be present and aid the commission in all of its deliberations, and I am frank to say that after eighteen months' experience in enforcing this law, the letters of appreciation addressed to our office after inspectors have visited plants and ordered changes, exceeded by a ratio of 30 to 1, the letters of objections. Therefore, if that is possible in Illinois, it is possible in every other state in this Union. And the gratification is in the simple fact that the manufacturers are appreciative of efficient administration.

This is the Illinois Idea.

In the enforcement of the various statutes charged to the Illinois Department of Factory Inspection, we have endeavored to so equip the department and train our inspectors, that the attention of both employer and employe may be called to the benefits which will accrue from a full compliance with these regulations.

And our experience is similar to that of officials of all state departments dealing with similar laws—that is, there are so many new subjects ever arising, to which no statutory law or ordinance regulations apply, that whether from the viewpoint of employer or official we must admit the necessity for additional laws if we are to reach the maximum scientific standard of accident prevention. In the enforcement of the laws the proper education and instruction to employer and employe should be given, and before prosecution, moral persuasion should be tried; when these efforts fail to bring about respect for, and compliance with, the law, then vigorous prosecution must follow with the usual penalties.

While we have had some differences of opinion with engineers, as to the practicability of the inspectors' instruction, I am pleased to say that only in a very few instances was it necessary to change the instructions, after they were thoroughly understood.

Some of the safety engineers upon receiving instructions to guard this or that machine, have said it was impossible and impracticable, and it is surprising that in most every instance the department through its inspectors and research department has been able to show to many of the safety experts of the various establishments that the order issued was not only a fair one, and a good one, but a practical one, and in each instance, after the technical instructions were issued, the corporation expert adopted and approved the method of safeguarding the particular point of hazard.

It is not an exceptional occurrence that the trained factory inspector has been of valuable assistance to the superintendents of safety departments of large concerns, in pointing out the weakness in their equipment for the prevention of accidents. There is a cause for this and the explanation is simple, because while the head of the safety department of any particular plant is kept busy devising ways and means for the reduction of the hazard of his concern, the inspectors cover many plants of like kind, and therefore are enabled to garner the information of the combined thoughts of the safety engineers. An inspector visits in the course of his duties, every available kind of an establishment and examines every make of machine—modern or ancient—and his eye is by dint of service trained to look for little things, for he knows the dangers of the big ones.

Later on in this article, which I do not expect to read in full, I have endeavored to express my idea, which I am pleased to call "The Illinois Idea", of what should be an ideal for a standard factory inspection department, or preferably, State Department of Industries. But the pertinent question now is, to express what we believe, by virtue of our experience, are safety standards determined by state inspection.

I have enumerated in an offhand way the safety standards which we, in Illinois, have established through statutory regulations. I have already expressed by the simple review of the present law's requirements in this state what might be considered comprehensive standards which could be properly arrived at through state inspection.

As an additional illustration of further standards which it is possible to fix through an intelligent system of state inspection, I offer as a suggestion the following observations.

Let us say that under a desired standard a factory inspector was making an inspection to enforce the provisions of laws, which would put the plant or establishment on a scientifically well guarded and ventilated basis, providing the essentials for the health, safety and comfort of the employes.

The inspector, upon approaching a plant, should observe the outward construction of the building, its height, the character and proximity, size and number of windows; and observe if the building is equipped with fire escapes and if they are properly constructed; if there are any switch tracks adjacent to the buildings of the plant or on the premises of the same, see to it that the frogs are properly blocked so as to guard against workmen and passersby catching their feet in the same; observe if there is any element of danger in the close proximity of railroad tracks to buildings and platforms; if so, there should be required a space of at least 32 inches between the cars and the walls of the building, and proper tell-tales erected, but where tell-tales cannot be used peculiar sounding gongs should be required, and sufficient space between the car and loading platforms should be provided, with due regard to the practicability of loading and unloading. Observe all canopies and outside gangways; if the roof of the canopy is used for a passage or for trucking, the roof of the same should have a rail at least 34 inches high.

If the outer gangways are used for transportation of material, then a sufficient means of protection should be provided, either by space or otherwise, so as to minimize the danger of an individual being crushed between the walls or sides of the gangway and the cars or trucks which pass through it.

Observe if the building is undergoing repair or if there is construction work going on, for in such an instance all scaffolding should be properly constructed and capable of supporting four times the weight that is required to be depended thereon; and where painters' stages are used a railing 34 inches high, extending along the entire length of the outside, and across the ends thereof, should be required, and the same should be securely fastened or bolted thereto; and safety ropes should be provided for an emergency in case of accident to tackle or controlling ropes. Swinging scaffolding, wherever practicable, should be fastened to the building to keep the same from swaying or swinging outward.

Note the proximity of water plugs, possible water supply and external provisions which would be called into play in case of fire; if there are outside closets used for toilets, are they properly constructed, kept clean and disinfected.

Walk around the building or buildings of the plant; notice the construction of all doors that are used for exits, and require that the same shall open outward, slide or roll; such doors as are used for exits should not be locked, and they should be so constructed as to be easily and immediately opened from within in case of fire or other emergency.

If there are buildings under construction, there are further rules to observe which are expressed in detail later on in this article.

As you enter the building, ask for the person in charge, obtain an audience with the owner, operator or responsible person in charge; present your card and if necessary or expedient show your star and present your commission of authority to inspect. State that you desire to make an inspection under the laws of the state.

Then go to the boiler room and note conditions of boilers; require that shields be placed on water glass, and check valve to shut off the steam in case of breakage; where boilers are installed in batteries a check valve should be required to prevent the return of steam in case of the blowing out of flues or in any other emergency; and if in the boiler room there are any faucets which may be or are likely to be used by one who is not employed in the boiler room, a prohibitive sign of warning should be placed above the faucets, advising of the danger of scalding which might come to an inexperienced person making use of such faucets.

Observe the storage of coal or fuel, see that it is not banked too high or in such a manner that it is liable to slide and cause an accident. If any element of danger is present order the necessary changes. Boiler inspections should be made by expert boiler inspectors; further details relative to proper boiler inspection are not called for at this time, because you have with you the Chief Boiler

Inspector of the State of Massachusetts—Mr. Joseph H. McNeill—who is far better qualified to speak on this subject than I. Take the temperature of the room and if there is an unnecessarily high degree of temperature order it corrected, and in all instances require that the boiler room be equipped with mechanical means of ventilation, unless sufficient means of natural ventilation already exist.

Pass from the boiler room and enter the engine or dynamo room, whichever the case may be; observe the following rules: direct that rails should be placed alongside of the crank and piston rod on engine; all ball governors should be properly enclosed; all fly wheels and pulleys should be enclosed, fenced or railed; all dangerous elevations and openings should be properly railed or enclosed. In a good many instances an additional device other than the governor should be provided to prevent an engine from racing; observe the system of receiving and sending signals to and from various parts of the plant relative to starting or shutting down the prime mover; and provide that it be effective and regularly tested. Vertical ladders are not desirable where it is possible to install stairways; this rule regarding ladders or stairways should be followed throughout the entire plant. If dynamos are used they should be within an enclosure; all switch boards of high voltage should be enclosed at the ends. In many instances it is practical to order a mesh wire or metal hood guard over the brushes which will permit of ventilation, especially when the brushes are exposed and abut on passage ways.

The dynamo room in all instances should be separate from the boiler room and the door kept closed between them at all times when not used as means of exit or entrance.

The wires leading from the dynamo to the switch board should be stranded double braid, rubber covered wire, drawn through iron conduits. The switch board should be fully equipped with circuit breakers, volt and ammeters and with a ground detector. All switches to be of sufficient ampereage to carry their respective loads. All wires should be run in conduit and connection made through knock-out boxes; all connections to be soldered and taped with both rubber and friction tape; all sockets to be fibre lined and in damp places such as breweries, underground tunnels and cellars, there should be water proof sockets soldered to circuit with nothing smaller than No. 14 B. and S. gauge rubber covered wire and in many instances a vapor globe around the lamp is advisable. All loose ends of wires should be properly taped up and no exposed ends left to dangle in the air or left lying around loose.

A low tension voltage should be used but where high tension voltage is permitted suitable signs should be conspicuously displayed marked "Danger" in large letters. All switches, cutouts and fuse blocks should be enclosed in steel cutout boxes fitted with a hinged door and catch. All knife switches should be installed so that when the switch is open the blades will be dead.

It is understood that while in the plant you are to observe the following rules: See to it that in each room a proper shop notice is posted and that the same is printed in such languages so that the information contained in the notice will be intelligible to the employes.

Upon entering the room or rooms of the plant, observe power transmission, main and line shafts and counter shafts, etc.; require that they be equipped with proper disengaging device, such as clutches or other effective means or device for shutting off the power in case of need or accident, and suitable means for operating the clutch or power disengaging device should be provided and placed within easy reach of the employes or operators.

Observe these rules on going from floor to floor, department to department; prohibit the use of lag screws, which are sometimes used for the purpose of supporting hangers for shafting; the hangers should be supported with bolts through the joists or beams and fastened with jam or lock nuts. All projecting set screws on moving parts should be counter sunk or otherwise properly covered to protect the workmen from what is one of the most common accidents in establishments where shafting and machinery are used, and undoubtedly one of the easiest ones to remedy; where the pulleys on line shafts are within two feet of hangers, the sides of the pulleys near the hangers should be properly guarded to prevent accidents to those who oil bearings or adjust belts. Mechanical belt shifters should be used for shifting belts on cone pulleys, as there is danger of being caught between belt and pulley, or otherwise injured. Overhead belting should be guarded, particularly that of large size and great speed.

Shafting, belts, pulleys, cones, couplings, in close proximity to oilers' platforms should be properly enclosed or guarded; all vertical belts which are so arranged that they are in, or near a passage way should be properly enclosed to such a height as to prevent employes coming in unnecessary contact with the same; all machines driven by belts should be equipped with belt shifters; belts should never be shifted by hand; there should be at least 7 feet head room between the floor and all horizontal and diagonal belts; exposed projecting setscrews and bolts on moving parts of all machines should be countersunk, and where impractical to countersink, projection should be properly enclosed or guarded.

The traversing part or carriage of any self-acting machine must not be allowed to run out within a distance of 20 inches from any fixed structure, if the space over which it runs is a space through which any employe is liable to pass, whether in the course of his employment or otherwise. Machines should not be placed so close together as to be a serious menace to those who have to pass between them; all exposed gearing on power driven machinery should be properly enclosed; all sprocket wheels should be enclosed; for the purpose of illustration guards should be placed over all circular saws, and the top and bottom wheels of all band saws should be enclosed; place guards over knives on wood shapers; place guards over knives or head of jointers; place cover over knives of gainers. All line or countershafts on or near the floor should be properly enclosed.

To deal with each machine separately and name the specific points that should be guarded would be a needless task, for each industry employs many different machines, distinct in character and operation, so to arrive at what would be safety standards in any given industry, it would be necessary to enumerate the particular machines employed in such industry, but it serves the purpose to cite a few examples, picking here and there an industry, specifically naming the machine and calling attention to the points of danger present. There are rules which should be applied, of the same principle to the various characters of machines in the various industries.

Exposed belts, pulleys and gearing are especially dangerous in laundries on account of the great number of women employed in that class of work. All mangles should be equipped with safety stops in front of rolls. Due regard should be given to proper temperature and humidity. Hydro-extractors should be equipped with covers in such a manner that machine can not be started until cover is in place; and so cover can not be raised until inner kettle is stopped. Dry and well ventilated dressing rooms and lockers should be provided. Steam hammers, drop hammers and trip hammers should be provided with some means for holding the head, other than the original means of blocking when dies are being changed, for in most all cases the head is held merely by blocking and this is not always safe, as there is not room enough on the head outside of the die to make the blocking secure; safety dogs should be used in connection with lathes to overcome the danger of the operator being caught on set screws, and especially where high speed is used in the process of turning. Automatic guards should be provided at the point of work on stamping presses; this is practicable in many cases notwithstanding many assertions to the contrary.

Another much overlooked danger present in many plants is that of emery wheels; they are rarely properly guarded against dangers which arise from breakage and what is commonly called "an emery wheel explosion". Emery wheels should be guarded by a heavy metal guard in cases where they run at high speed and are subject to heavy pressure; they should also have safety flanges which are good things, but I do not consider safety flanges alone a full protection against the dangers which ensue from breakage; a cup washer should be used on emery wheels where the nature of the work requires that pieces that are being ground be held close to the side of the wheel; all emery wheels, except small wheels such as are used for grinding tools, should be equipped with proper exhaust devices for carrying away the dust.

Revolving tumblers or rattlers should be properly enclosed, for too frequently a projecting bolt will catch one's clothing; accidents of this kind are not rare; and in addition to being enclosed they should be provided with an exhaust system for carrying away the dust. Where men are employed in chipping burrs off of castings and other character of work which causes sparks to fly, they should be compelled to wear goggles.

Hydraulic cranes should be equipped with safety devices to prevent falling of the boom in case of accident or breakage of pipes, valves, or pumps or blowing out of gasket.

Gears, pulleys, chains, sheaves and blocks should be tested frequently for the purpose of detecting the presence of cracks or defects which would materially weaken them.

In many establishments large blower and suction fans, which are incidental to the process of the business, are used for ventilating purposes; the orifice or intake of these fans should be guarded with a heavy screen mesh to prevent those passing by or near to it, from losing their equilibrium, or being drawn into the same, because of the suction.

Turbine extractors should be placed within steel enclosures; iron will not do, and great care should be used for the prevention of excessive speed, as excessive speed is very apt to cause what is known among mechanics as explosions.

Too great care cannot be observed in the handling of molten metal; it never should be conveyed or handled over wet floors or depressions where water can seep through; keep the water as far away as the exigencies of the industry will permit. If the mold or the form that the molten metal comes in contact with, has not been thoroughly dried, then look out!

Where clay crushers or mud mixers are used a properly constructed railing should be provided, of sufficient height to prevent one from falling into the pan; we have had deaths reported from this oversight.

Where mineral wool is created proper suction fans should be installed for drawing the dust to the outside air, or to some receptacle, so as to protect the men from the danger of getting it in their skin, in their eyes, ears and mouth.

The inspector having progressed this far in his observations and in the issuing of instructions, has evidenced a careful study of the mechanical departments, but he has not nearly finished with his inspection, for there arises the question not only of the construction of the plant, the floors, the walls and the sustaining power thereof, but the question of ways and means of handling the materials, the elevators, stairways, ventilation, sanitation, general hygiene, light—natural and artificial—dusts, gases, fumes, odors, and explosions, panic and fire protection. It is of course understood, that the system of inspection cited in this paper would not apply to all kinds of establishments, but these would be the duties of a factory inspector under an up to date system of inspection covering all the fields under his chief's supervision.

Let us proceed. The inspector goes from floor to floor, observes the treads of all stairways; are they worn? are there any projecting nails? If so order the same put in proper repair; if there is no hand rail on the side of the stairway, one must be provided. Thus the inspector reaches the top floor of the building, then he calls for the elevator to be brought to that floor. He examines the elevator machinery, strength of the cables, sustaining power and lifting weight, etc., the elevator car, the safety clutches on the same, their effectiveness, the guides or runners, shipper rope, and governors; and if these be in good repair, all right; if not, he orders corrections to bring it up to the proper and recognized standards of safety.

If it is a freight elevator it should be enclosed on all sides other than the side or sides used for loading and unloading material, and the enclosure on the sides should be not less than 6 feet high, and the top of the elevator car should be covered with a heavy wire screen; this could be made to either slide upward or fold in cases where the elevator is required to be used frequently, or otherwise, for the carrying of boards, lumber or other lengthy material. There are instances where the floors project into the elevator shaft and the well or shaft is of such construction that if a man's foot sticks over the edge of the car, it might be pinched between the projecting floor and the floor of the car. In such instances a guard of some kind should be put in, so as to make a gradual slope from the projecting floor to the wall of the elevator well. This is commonly known as a bevel.

There should be a trap door at each floor, known as a fire door, which would in case of fire, automatically release itself and fall or close; all elevator shafts or wells, whether the elevator is used for passengers or for freight, should be properly enclosed, and the entrances to all freight elevators on the various floors should be equipped with automatic gates of sufficient height to guard against accidents and the lower edge of said gates should come, as near as practicable, flush to the floor. Thus these gates would be so constructed that they would prevent material, small or large pieces of metal, or what not, from rolling, falling or being kicked into the shaft. Signal systems advising of the location and of the rise and fall of the elevator, should be established.

Having finished with the elevator the inspector should examine the floors of the establishment, look for weak spots, splintered, torn or otherwise, and if it is in bad repair, order the necessary repairs; note the approximate load the floor is sustaining; is it capable of properly sustaining the weight? No floor space of any workroom in any establishment should be so overloaded with machinery or other material as to cause serious risk to, or endanger the life or limbs of any employe; observe and inquire as to the methods of sweeping or cleaning; all sweeping, in so far as possible and practicable, should be prohibited during working hours; but if done during working hours it should be done in such a manner as to avoid the unnecessary raising of dust or obnoxious odors. Decomposed, fetid, putrescent matter, refuse, waste and sweepings should be removed and disposed of at least once each day and should be done in such a manner as not to cause a nuisance.

If any process is carried on which makes the floors wet, the floors should be constructed and maintained with due regard to the health of employes, and gratings or dry standing room should be provided wherever practicable at points where employes are regularly stationed, and means should be provided for drainage and for preventing seepage or leakage to the floors below.

The doors and windows of all establishments should be ordered opened and kept opened for a reasonable period of time before all working hours and at meal times, so as to allow the place to be well aired; this with due consideration of the outside temperature and weather. If this be not sufficient for proper ventilation, and mechanical ventilation is essential and necessary for the proper protection of the health of the employes, it should be installed, and equipped so as to provide fresh air in such a manner as not to create injurious drafts or cause the temperature of any room or apartment to fall materially below the average temperature maintained, and no part of the air so supplied should be taken from any cellar or basement, but wherever practicable and reasonable the air supplied through mechanical ventilation should be washed and properly tempered.

Effective means and devices, alterations or installations should be ordered wherever necessary to keep the establishment free from any gas or effluvia arising from any drain, sewer or privy.

The standard requiring ventilation and equable temperature should be enforced. This naturally is governed by the rule, that wherever applied it shall be with due regard to the requirements of the manufacturing processes, as for instance: In an establishment where there may be departments where a high polish is being placed on wood work, etc., minute particles of dust or peculiar circulations of air would be injurious to the industry; this is also true relative to temperature in some instances. Wherever poisonous or noxious fumes or gases arising from any process are present, a ventilating or exhaust device should be installed for removing same, and this rules applies to removing insofar as possible all dust injurious to the health of the persons employed.

The number of employes that may be employed in any given space should be set by a standard, and I would advocate that not less than 500 cubic feet of air space be provided for each person, thus providing against the evils of overcrowding.

As a further suggestion concerning standards of lighting and ventilation and working space, I would suggest that the number of people permitted to be employed in any room should be governed by the rule that 500 cubic feet of air space shall be allowed to each and every person employed, and fresh air supplied by ventilation at the rate of 4 complete changes of air per hour during the hours of employment; provided, that in cases where the lights used do not consume oxygen, the ratio may be one-third lower.

It is unfortunate that in the construction of buildings, up to a few years ago, there was not sufficient attention given to the study of lighting plants by natural light, and consequently many of the factory buildings are provided with inadequate window space; the window space should always be equal to at least one-eighth of the floor area.

With proper regard for the peculiarities of manufacturing processes, there should be a standard of a qualitative test of the air. Generally speaking a minimum standard should be established, which would require that the amount of carbon dioxide present should not exceed 9 parts in 10,000; and in the seasons of the year when it is necessary to provide heat for the comfort of the employes there should be required a regular degree of temperature and proper attention to humidity; and where the employes, by reason of the class of work in which they are engaged, are required to remain seated during the working hours, at least 7 degrees higher temperature should be maintained as compared with the temperature maintained in the rooms where the employes are standing and their bodies are kept in motion. And the air should not be polluted by what is known as the smoke nuisance.

An adequate supply of water should be provided and the quality of the water should be suitable for drinking purposes.

Proper lighting of the establishment is essential for the preservation of good eye sight and the prevention of accidents; natural light is much preferred to artificial light, but where artificial light is used, care should be taken to see that the light is properly shaded, wherever practicable. When it is necessary to light the establishment with artificial light, such as electricity, an accident to the generating equipment would throw the entire plant into darkness and perhaps result in a panic, or it might be the direct cause of accidents.

Therefore, in large establishments wherever it would add to the safety of the employes, a system of lighting separate from the main system of lighting should be installed and lights should be provided in all main passage ways, main hall ways, main stair ways, stair landings and entrances to elevators. These separate lights should be kept burning during the working hours whenever the influx of natural light is insufficient; all passage ways, alleys or gangways, entrances, etc., to stairs and stair landings, exits to fire escapes should be kept free from obstructions and the fire escapes should not be used for storage purposes.

Sufficient means of exit in case of fire should be provided in every instance; stairway fire escapes should be installed, ladder fire escapes discarded; fire escapes to have proper landings should be equipped with counter balances and the platforms should connect with not less than two windows wherever possible, and it is to be preferred that all exits to the fire escape should not be window openings, but should be flush with the floor; the most desirable standard is to have an arrangement of exit doors that would swing outward and away from the approach to the stair way of the fire escape; but if the exit to the fire escape is from a window sill, then steps or proper footing should be provided, and in no instance whatsoever should the exits to the fire escapes be blocked by tables or radiators or other obstructions; the fire escape should be painted at least once a year with a quantity and quality of paint which would prevent rust, in so far as possible.

In all establishments where numbers of people are employed a fire drill should be maintained and a fire alarm system installed, and in buildings where various floors are occupied by separate firms or concerns a system of alarm should be so arranged that should a fire break out on one floor, the alarm would be announced on each floor of the building. And it is the obligation, not only of the employer and the heads of the departments, but of every employe, to understand how to maintain reasonable order in case of fire, so as to understand by virtue of fire drills how to leave the building without creating a panic.

I intended to go into the question of fire risks, such as dangers of ignition, combustion, explosives and also other subjects, such as legislative provisions for a properly equipped department of industry, but did not have the time. I was unable to give my attention to the preparation of this paper until a few days ago. This humble effort has been put forth with the hope and desire that it may do some good and in the course of discussion bring forth expressions which will lead those interested in factory inspection to a closer study of the problems.

When laws are passed which fix practical standards, it is important that the courts sustain them, and this reflection suggests to my mind one of the most useful things which the American Association for Labor Legislation could possibly do, and in so far as I know, the action I suggest has never been properly undertaken or effectively followed. I refer to the dissemination of knowledge among the judges and lawyers of the country in regard to the necessity for modern and progressive labor legislation. The judges of our courts are unfortunately entirely out of touch with the industrial conditions, by reason of the fact that their work is usually arduous and confining, and there is seldom any opportunity, even where there is a disposition for them to learn very much about actual working conditions and the need of new legislation to correct existing evils, and the necessity of passing and sustaining such legislation, if we are to conserve the health, the happiness and the welfare of those who daily toil for a livelihood.

The situation with the legislative branch of government is quite different. Social settlement and labor reform advocates present their suggestions to the legislature often in the concrete form of bills to be introduced covering the conditions which they seek to remedy, and specialists in labor and economic affairs present their arguments and statistics in support of such bills before the legislative committees and the legislature itself, with the result that the legislature is given a course of education in the subject presented by the proposed legislation, and are brought to see the necessity for it. But after the bill is enacted into law we indulge ourselves in the fiction that the judges know all things, and by reason of the conservatism of our judiciary, and its unfortunate isolation from ordinary business affairs and conditions, the legislation is usually presented to the attention of the court in the form of a lawsuit involving certain abstract principles of law, and the busy judge before whom the case is tried is very likely to treat it very much like any horse or cow case that comes before him, without appreciating the importance of his decision, or the consequences which it may entail, and without having the benefit of the advice and information which was presented to the other branch of the government when the bill was passed into law. He approaches the consideration of the law and its constitutionality with certain habits of mind and thought, which are the result of his common law training, and which habits of thought are not influenced by any special education or training in economics, and the result must inevitably be that the subject presented strikes the court as being novel and some times shocking in its progressive terms, and the court is unable to see how it can make the legislation fit with its ideas of constitutional law and the police power of the State. I do not mean that the judges wish to be in any sense out of sympathy with modern remedial legislation, but in the quiet of their chambers or in the hurry of their court rooms they are given very little opportunity to enlighten themselves on subjects which are being covered by modern labor legislation, and very little opportunity comes to them to get into sympathy with any such movements.

That statistical information, with reference to labor condition is of controlling importance in the decision of cases involving the constitutionality of labor laws is forcibly illustrated by the decision of the United States Supreme Court in "Mueller vs. Oregon," where the court passed on the ten-hour law for women. In leading up to its remarks with reference to whether the legislation was reasonably required by labor conditions, the court said that in patent cases it was frequently desirable to inquire into the state of the art, and they thought the same rule might apply to the consideration of a statute regulating the hours of labor for women, and that it was proper for them to inquire into and consider the state of things with reference to females in laundries and mechanical establishments, and although the course pursued by the court was somewhat unusual and almost entirely without precedent, they said that they would consider statistical information which had been filed in the court by counsel in the case, showing disastrous effects upon the health and happiness of woman workers by hard labor, and the court said that while these unofficial reports and publications were not in the proper sense precedents which the court might follow, yet they were useful in enabling the court to arrive at a proper understanding of the conditions which existed among women workers and to determine as a matter of law whether the legislature was justified in its decision that legislation limiting the hours of labor was a proper exercise of the police power of the State, and whether, under the conditions existing, a regulation of this kind was reasonable and not arbitrary. This decision and some others of like kind illustrate forcibly the desire of the courts to be informed upon questions of this kind, and this disposition ought, in my judgment, be taken advantage of, and a systematic campaign of education should be carried on by this Association in the form of circulars and bulletins issued to the judges, lawyers and bar associations, and perhaps lectures and stereopticon addresses delivered to bar associations and other organizations when the opportunity presents itself.

Public sentiment will make most any statute constitutional, if the sentiment is strong enough; while on the contrary, lack of information and sympathy, with reference to legislation and the conditions which it is designed to meet, will prove fatal to most any legislation of this character when it reaches a final test in the courts.

GENERAL DISCUSSION.

Henry R. Seager, *of Columbia University:* The Wisconsin plan described by Professor Commons, must appeal to everyone who has learned through experience how impossible it is to embody in rigid statutes the regulations called for by the complex and ever-changing industrial conditions of today. In New York the Commission on Employers' Liability, the Causes and Prevention of Industrial Accidents, and Unemployment, of 1909-1911, gave careful thought to this problem. It hesitated to recommend to the legislature a plan that would be open to the objection of delegating legislative power to an administrative body, from the fear that this might be declared unconstitutional. As an alternative, in its Report on the Causes and Prevention of Industrial Accidents submitted April 20, 1911, it recommended that the Commissioner of Labor be empowered to make, and from time to time change or modify, general rules or regulations for the guidance of his inspectors in enforcing the safety requirements of the labor law, these rules and regulations to apply in whole or in part to particular factories or particular machines or apparatus either already installed or to be installed in the future, according to the judgment of the commissioner. Although such regulations would not be binding on the employer in the sense that he might not appeal from them to the courts to determine their reasonableness, it was thought that they would serve the same purpose, since in practice employers would, it was believed, accept them as controlling.

Some of the members of the commission objected even to this enlargement of the power of the Commissioner of Labor, on the ground that such power might possibly at some future time be used as a means of levying blackmail on employers. To meet this objection a clause was added to the bill that was recommended to the legislature, to the effect that no such regulation should become operative until it had received the approval of the governor. In this form the bill was passed by the legislature only to be vetoed by the governor. The ground for his disapproval was that it imposed upon him a responsibility for passing on regulations prescribed by the Commissioner of Labor which he was not qualified to exercise wisely. It is highly probable that a similar bill, without the clause objected to by the governor, will be introduced in the next session of the legislature with good prospect that it may be enacted into law.

Miss Lucile Eaves *of the University of Nebraska* called attention to the decision in California which declared unconstitutional a general statute requiring protection from dusts, on the ground that the legislature could not delegate legislative powers to an individual. Prof. Commons replied that the California statute in question would probably have been declared unconstitutional in Wisconsin on the ground that it gives to an officer, discretionary power not safeguarded by the constitutional proceedure requisite.

Miles M. Dawson, *Consulting Actuary and Attorney, New York City:* Nothing, perhaps, is more noteworthy than the growth of the opinion in the United States and in other countries, notably Germany, that the governmental administration of affairs should be entrusted to experts so far as possible. This notion, while apparently new, is really very old, having been put forward strongly by two of the greatest minds of ancient days, Socrates and Confucius. In China it has been utilized to a most remarkable degree, and, notwithstanding any defects in the government of that great nation, it is noteworthy that it has endured from before the dawn of history, surviving all sorts of changes, and that, on the whole, the condition of its people has been so extraordinarily prosperous that they have long called their nation "The Celestial Kingdom." Its success there has been due chiefly, no doubt, to its democratic basis, every boy in China being free to attain the highest office merely by showing his superiority in the study of the art of government, as set forth by the ancients, in repeated competitive examinations, accompanied by excellence of administration in the various offices to which he is advanced. In like manner the work of experts in government in the United States is likely to be most successful and least oppressive, if it also be democratic, both in origin and in character.

Thus, the purely bureaucratic management, either of the administration of compensation laws or of state insurance funds is not likely to be as satisfactory, and has not proved as satisfactory anywhere, as the combination of expert supervision with democratic administration. That is to say, neither a system, such as in Denmark, of strict enforcement of the compensation law by a bureau which even adjusts all claims, nor the management of a state insurance fund by a bureau, as in Norway, has proved so efficient and satisfactory as the mutual management of associations of employers of the same general industry, under the supervision of government experts, in Germany.

Thus, for instance, in the matter of prevention, the officials of these departments in Norway, Sweden and Denmark had a meeting not long ago, representing a country where there is compulsory state insurance; another, where there is state insurance in competition with private companies; and a third, where there is a system of rigorous government administration of the compensation law. There were many interesting subjects on the program, but prevention of accidents was not mentioned. In each country it is in the hands of an entirely separate department, which is jealous of its rights, and will not brook interference.

III

UNIFORM REPORTING OF INDUSTRIAL INJURIES

Saturday Morning Session, September 16, 1911.

Presiding Officer: John R. Commons
Member, Wisconsin Industrial Commission.
Madison, Wisconsin.

THE BEGINNING OF OCCUPATIONAL DISEASE REPORTS

John B. Andrews
Secretary, American Association for Labor Legislation.

In the year 1911, for the first time in America, six states enacted laws requiring physicians to report cases of occupational diseases. These states are California, Connecticut, Illinois, Michigan, New York and Wisconsin. A glance at the accompanying table is sufficient to show that these laws have many points in common, and that most commonly the diseases to be reported are: *anthrax, compressed air illness, and poisoning from lead, phosphorus, arsenic, mercury, or their compounds.* In Wisconsin for some unexplained reason, anthrax is omitted from this list, and in Illinois the law is obscure but apparently includes poisoning from "sugar of lead, white lead, lead chromate, litharge, red lead, arsenate of lead, or paris green," and "the manufacture of brass or the smelting of lead, or zinc."

In most instances the notification by the physician is to include as a minimum the name and full postal address and place of employment of the patient, and the disease. Michigan specifically requires in addition, "the length of time of such employment," and New York adds, "with such other and further information as may be required by the Commissioner of Labor."

In four states the reports are to be sent to the State Board of Health and thereby transmitted to the department most directly interested in industrial inspection within the state. In Connecticut and New York notification is direct to the Commissioner of Labor.

In every state except Connecticut there is a penalty for failing to report, but in all states except California and Connecticut where a fee of fifty cents is allowed, no compensation is paid for reports.

It is an interesting fact that one of the features of this bill which excited most comment among physicians was the provision for the payment of a fee of fifty cents for each report. "It is an insult to offer a medical man a fee for sending in a report to the State" exclaimed many physicians, while fully as many declared that the offer of fifty cents would result in the sending in of too many reports![1]

This pioneer legislation is part of a definite organized effort to arouse wider interest among physicians in the subject of industrial hygiene, and to secure for public use a regular supply of information from those who should be best informed upon the subject. For this purpose a tentative bill, based upon twelve years of English experience,[2] was drafted and introduced in 1911, into the legislatures of eight leading industrial states. This bill had been passed unanimously by one house of the Minnesota legislature when adjournment postponed action for two years. In Pennsylvania some legal experts added a clause to one section of the bill and after it had passed both houses of the legislature the governor vetoed it on the ground that this particular new clause made it "unconstitutional." In Illinois where the State Occupational Disease Commission was still at work, no action was taken by the friends of the measure after reaching an understanding that the reporting feature would be included in the commission's bill. With the slight local modifications already noted the standard bill was enacted, and it went into operation in six states during the summer.

The educational campaign resulting in the enactment of this measure included the publication and distribution of a special four page leaflet on "Reporting of Occupational Diseases." This leaflet included the following statement:

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[1] Under the British law the notifying physician is allowed sixty cents for each report. In the United States the following provisions are made by law for the payment of persons making reports of vital statistics: Delaware, 5c. to physicians for each birth certificate; Illinois, 25c. to physicians, midwives, parents, house-holders, coroners, for each birth or death certificate; Kentucky, 25c. to physicians, midwives, for each birth or death certificate; Massachusetts, 25c. to physicians, midwives, undertakers, for each birth or death certificate; Michigan, 50c. to physicians, midwives, nurses, for each birth certificate; Montana, 15c. to physicians, midwives, parents, house-holders, etc., for birth or death certificate; New Hampshire, 25c. to persons reporting birth, marriage, or death; New York, 25c. to person returning birth or death certificate; Oklahoma, 10c. to physicians for each birth or death certificate; Rhode Island, 25c. to physicians, midwives, for each birth certificate; 5c. to undertakers and others for each report of death; South Dakota, 25c. to physicians and others for each birth and death certificate; Vermont, 25c. to persons making reports of births or deaths; West Virginia, 25c. to physicians, accoucheurs, house-holders, coroner, etc., for each report of birth or death; Wisconsin, 25c. to physicians, midwives, ministers, court officers, etc., reporting birth, deaths, marriages, or accidents.

[2] Upon the advice of expert medical authority in England only a few of the most clearly defined and most easily recognizable of occupational diseases are included in the beginning. When physicians have become familiar with the purpose and the operation of the law, its scope may be extended.

> When the International Congress on Occupational Diseases met at Brussels last September, Dr. Legge, Medical Inspector of Factories in England, read a paper on "Results of Ten Years' Notification of Lead Poisoning." In 1900 more than 1,000 workers in that country were reported as suffering from this occupational poisoning. Last year the number was only 553, although the system of recording each case has steadily improved. In some branches of the dangerous trades in England this occupational poison is now only one-fourth as serious in its effects as ten years ago.

In partial explanation of this striking improvement in the conditions affecting those who work with industrial poisons, the leaflet continues:

> In Great Britain when a practicing physician observes in a patient symptoms which lead him to suspect that there is suffering from industrial lead, phosphorus, mercurial, or arsenical poisoning, or anthrax, he is compelled under penalty by the Government to report the case to the factory inspector. Scientific men in the public service are then in a position to study intelligently the conditions which undermine health, to suggest simple, inexpensive precautions to the manufacturers, and to instruct the workpeople in the use of measures for the prevention of unnecessary suffering and death.
>
> Every class in the community is directly interested in scientific efforts to conserve the health, vitality, energy and industrial efficiency of wage-earners. This interest is particularly apparent in cases of suffering and inefficiency due to unhealthful conditions of employment in occupations where deadly poisons are in use.

After briefly summarizing the causes and effects of anthrax, compressed air illness, and poisoning from lead, phosphorus, mercury and arsenic, the descriptive portion of the leaflet concludes as follows:

> In order that the necessary mechanical and other precautions may be taken, the State should be enabled to determine where and how men are exposed to these perils. The State should be advised of incipient cases, so that dangerous conditions may be improved. English experience during twelve years indicates that the most practical and economical method of securing this information is through the enactment of a law requiring every physician treating a case of one of these occupational diseases to report it to the proper authority precisely as he now reports cases of contagious diseases. From the data thus contributed preventive and remedial measures can be intelligently formulated and applied. The American Association for Labor Legislation, in its campaign for the Conservation of Human Resources, invites the co-operation of other organizations in securing uniform legislation on this subject.

This printed leaflet, the final page of which was a tentative bill, was accompanied by additional literature and circular letters and addressed to legislators, editors, and members of the Association for Labor Legislation who added their personal influence to the campaign and in several instances appeared at legislative hearings to explain the object of the measure.

MAIN PROVISIONS OF LAWS OF 1911 RELATIVE TO REPORTING OF OCCUPATIONAL DISEASES.*

State	Diseases to be Reported	Reports to Include	To Whom to Report	Penalty
California Ch. 485. Approved Apr. 21. In effect, June 20, 1911.	Anthrax, compressed air illness, and poisoning from lead, phosphorus, arsenic or mercury, or their compounds.	Name and full postal address and place of employment of the patient, and the disease.	State Board of Health, and thereby transmitted to the State Commissioner of Labor.	Not more than $10.
Michigan No. 119. Approved April 25. In effect, Aug. 1, 1911.	Same as California.	Same as California. (and "the length of time of such employment").	Same as California.	Not more than $50.
Wisconsin Ch. 252. Approved June 2. In effect, June 5, 1911.	Same as California. (except that "anthrax" is omitted).	Same as California.	State Board of Health.	Same as California.
New York Ch. 258. Approved June 6. In effect, Sept. 1, 1911.	Same as California.	Same as California. ("with such other and further information as may be required by the Commissioner of Labor").	State Commissioner of Labor.	Same as California.
Connecticut Ch. 159. Approved July 18. In effect, Sept. 1, 1911.	Same as California.	Same as California.	State Commissioner of Labor.	None.
Illinois H. B. 250. Approved May 26. In effect, July 1, 1911.	Law is obscure, but apparently includes poisoning from "sugar of lead, white lead, lead chromate, litharge, red lead, arsenate of lead or paris green", and "the manufacture of brass or the smelting of lead or zinc."	Name, address, sex and age of employee; name of employer and last place of employment; nature, probable extent and duration of the disease.	State Board of Health, and thereby transmitted to State Department of Factory Inspection.	First offense, $10 to $100; subsequent offense, $50 to $200

*In all States except Illinois the obligation to report falls upon every medical practitioner or physician in Illinois, upon any physician making the required monthly examination of employees in certain specified industries. In all States except California and Connecticut where a fee of fifty cents is allowed, no compensation is paid for reports by the State.

From the standpoint of the Association the real educational work is merely begun with the enactment of these laws. With the arrival of the date when each law went into effect a news notice was prepared for editorial use in that state, and additional information, including copies of the notification schedule now in use by physicians in England, were furnished upon request to officials charged with the law's enforcement.

In New York the law was translated by an Italian editor, and with accompanying explanations it was widely republished among Italian readers. Cases of occupational poisoning incidentally met with in our related investigations are now carefully noted and filed for future reference, or mailed forthwith to the proper state authority.

The desirability of the uniform reporting of industrial injuries in the different states is so apparent to those who wish to make intelligent use of such statistics rather than merely to compile columns of figures, that an effort has already been made to encourage the adoption of a standard schedule.[1] To the rather meager information specifically required as a minimum under the various laws, the state officials are encouraged to add as many facts as possible through the use of more elaborate secondary blanks or by special investigations. One year's experience in securing this information in half a dozen states should indicate whether the standard schedule now in preparation is practicable for general use among physicians. Already, in several states, information of great significance has been secured by state authorities under this law, and individual physicians as well as boards of health are beginning to coöperate in the study and prevention of occupational diseases.

GENERAL DISCUSSION

In the general discussion which followed, Mr. Don D. Lescohier of Minnesota, suggested that in the first paragraph of the occupational disease schedule, the list of poisons be arranged one below another as:

Lead poisoning
Phosphorus poisoning
etc.

Mr. Leonard W. Hatch of New York suggested that, in the form of the letter of notification to physicians, in place of the list of poisonous substances within brackets in the first paragraph of the British notification blank, the matter be put in the form of straight reading text, displaying the list of poisons by use of italics.

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[1] A national committee on a standard schedule was appointed at the close of the session and it is now at work upon a plan for uniform reporting. See copy of resolution on page 142.

Prof. Henry R. Seager of New York said that the matter of the payment of a fee had been much discussed and he would like an expression of opinion on that subject. Mr. Hatch stated that the provision for a fee was struck out of the New York bill on account of the very cumbersome method required by the state comptroller's rules regarding departmental disbursements. The department, he explained, has no fund from which it could pay directly, and would have to secure vouchers from each physician for each report, present the same to the comptroller, secure the state treasurer's check and forward the same to the physician. He thought that the fee was not necessary to secure reports in New York and that most physicians would not deem it essential.

Prof. Lucian W. Chaney of the United States Bureau of Labor, thought that the reporting by physicians should be regarded as a social service. Dr. A. M. Harvey of Chicago, however, replied that, "Physicians should be paid a fair fee, say $1.00, for reporting occupational diseases. Reporting of births in Illinois is a failure, although the law provides for a report of all births, but does not provide from what fund the money or fees shall be taken. Fraternal orders, to secure *good* reports of examinations, had to increase their fees. Many cases of occupational diseases will be charity cases and the physician will take no interest in reporting such cases unless he is paid. The manner of payment is a mere matter of detail of the proper office. These officers are paid for performing their red tape. The doctor also should be paid."

Mr. John Calder of New York, also said that he did not think that the "vicarious services" already demanded from physicians and surgeons by the public at large should be added to by the State without some remuneration. "It is right and proper that the reporting of occupational disease should be performed by a scientifically trained person, and there should be an inducement to such persons to perform this task promptly and effectively. The whole status of our American physicians as regards average net earnings is so unsatisfactory that I favor a reasonable fee for reporting occupational diseases, certainly not less than half a dollar and if possible one dollar. Such a fee would greatly assist factory inspection departments to gather reliable statistics about a class of invalidity, the existence of which I have already found employers very slow to admit."

The discussion ended with a statement by Prof. George G. Groat, of Ohio, who said: "There seem to be two very good reasons why the law should provide for the payment of a fee to the physician. In the first place not all physicians are in the position of some of those who speak for them. Their practice is not large, and it is large fees for general practice. The report properly made constitutes a real service. Many of these physicians would look upon even a small fee as a gain. Such physicians as these would in many cases be the ones called, in case of industrial injuries.

"But this reason for the payment of a fee is not of such great importance as another one. It is this. The addition of a fee has the very important psychological advantage of making the physician feel that he is acting, in a very real sense, in the capacity of a public servant. There is no doubt of the fact that pressure is exerted to suppress information of accidents. The employer, the industry, and even the town, are all concerned in making it appear that accidents are few. This unseen but very real pressure is felt by the physician and unless counteracted it may be a determining factor in actually suppressing the knowledge of the facts.

"A publicity campaign on tuberculosis has had an effect that may throw light here. Before any particular attention was directed to the facts, the death rate was high. A campaign directing attention to this death rate has resulted, in order to protect the fair name of the town, in a marked decrease of this death rate. People now die of something else. Clearly everything should be done to establish the realization that in performing this work the physician is the servant of the public first, and a servant of his patient also. This result the fee cannot but help assist in establishing."

ACCIDENT RECORDS IN MINNESOTA

Don D. Lescohier
Expert, Minnesota Bureau of Labor.

We attempt no more in this paper than an exposition of the experience of the Minnesota Bureau of Labor during the past two and a half years in the collection and use of accident statistics. The detailed facts ascertained during the first year and a half of our work are in print, and we judge that what is desired in this meeting is the methods employed and a summary of the net results achieved rather than any analysis of statistics.

An "accident report" law must be judged by its success, first, in securing complete reports and, second, in securing reports that have practical value for purposes of compensation and prevention. The Minnesota statute requires "all accidents occurring to employes while engaged in industrial employments "to be reported to the commissioner of labor" within 30 days of the date of their occurrence. "Industrial employments" include all employments except railroad work outside of railroad shops. Full details concerning the person injured, the accident, and the physical and financial results of the casualty are required by law, and the information obtained is so complete that the only amendment asked by the Bureau of Labor at the last session of the legislature was the extension of the act to cover all railroad accidents. But the amendment was not passed.

There is more, however, in getting accident records than merely in having a good law passed. Untiring energy, interest and resourcefulness upon the part of those administering the law is as essential to success as the provisions of the law itself. I would rather have a good labor bureau and a poor law than a good law with an apathetic bureau. Energy, earnestness and honesty can get results even with inadequate legislation, but indifference cannot achieve results under any conditions.

A few words upon the methods we have used to get complete reports of the accidents may be helpful to other state authorities with similar duties, and we will venture to take a few moments for this purpose, even though many in this audience represent private organizations or corporations. We have the more courage in doing this since the statistics show that our methods have been effective.

In the fiscal year ending July 31st, 1905, 840 industrial accidents were reported to the Bureau of Labor in Minnesota; in 1906, 1043; in 1907, 1388; in 1908, 1096, and in 1909, 1590. The average number of reports during these five years was therefore about 1200 a year. During the year ending July 31, 1910, the first year in which the present law was in operation and the first year in which vigorous effort was made to secure accident reports, the number of accidents reported to the Bureau of Labor increased 700%—from 1200 to 8400. For the second statistical year, 1911, 8364 reports have been received. These figures are not final because a number of important firms have not yet complied with the law, though the Bureau will compel them to do so. A decrease of 557 in the number of mine accidents reported conceals an increase of 521 in the number of accidents reported from other industries than mining and hides the fact that the second year of the new law brought more complete reports than the first.

Efforts were made immediately upon the passage of the law in May, 1909, to acquaint all employers with it and secure their willing compliance with its provisions. A letter sent to every employer whose name was on our factory inspection records or could be secured from other sources, calling attention to the statute and assuring them that the bureau would both treat the employers fairly in its published analysis of the reports and also guard the reports carefully so that none of them might go into private hands and be used in damage suits. To insure absolute certainty in keeping the employers' reports confidential, the accident blanks, samples of which were sent with the letter, were printed on perforated sheets, with the portion identifying the firm and the workman at the top, where it could be torn off and filed out of sight of any chance visitor. This device has been an important aid in securing reports, and was probably in part responsible for the prompt response made to the letter in the first month after the law went into operation, July, 1909, which showed an increase of 200 reports over any month in the previous five years.

A special agent, university trained, familiar with the world wide accident compensation movement and competent to meet and discuss the accident problem in its various aspects with the employers, was next sent to the more distant parts of the state, particularly to the mining and lumbering regions, to clear away misunderstandings and explain the purposes of the law. His work, by removing hostility, distrust and misunderstanding, brought in thousands of reports.

These preliminary measures were followed up by unremitting efforts to secure knowledge of unreported accidents. To this end subscriptions were placed with clipping bureaus, the metropolitan papers closely watched by all members of the department, and requests sent to the trade unions to report accidents coming to the attention of their members. The clippings were and are of very effective aid, bringing up hundreds of reports annually that would not otherwise be obtained, but the trade unions do not justify the effort made in soliciting their coöperation. Even addresses before trade unions by trade union members of the department failed to secure effective assistance from them in 1910 and during the 1911 fiscal year this method of securing information was abandoned.

The labor commissioner's requirement that the factory inspectors call the law to the attention of each firm when making inspections is another effective aid. They inquire the number of accidents at each plant during the preceding year, whether the accidents have been reported, and whether the firm has accident blanks upon which to report. As a final check upon the employers the list of firms in each industry that have reported accidents is compared at the end of each statistical year with the list of all firms in that industry, and the firms that have not reported are then sent communications calling their attention to the law and inquiring whether they have had no accidents. These letters bring in a large number of belated reports, and afford an effective means of securing complete records. In those cases where no reports are received in response to this communication and where there is reason to believe reports are being witheld, it is our purpose from this time forward to seek evidence for prosecution under the law. No prosecutions for neglect to report have yet been made but it is probable that some are not far distant.

So much for the problems pertaining to the collection of accident reports in Minnesota. We now come to the question of their practical value, which depends upon the accuracy and adequacy of the information they contain when considered from the point of view of accident compensation and accident prevention. Minnesota's accident statistics will be adequate by 1912 to form the statistical basis of a workmen's accident compensation or insurance law. The only point at which they may be deficient is in reference to the periods of disability resultant upon different classes of injuries; but this weakness will probably be overcome by special investigations on this particular point. The disability question is, however, one of the most elusive problems in accident statistics. The figures will show the number of persons injured in each industry, both in total and by occupations, their wages and the nature of their injuries, and the cost that would be incurred in caring for them under the various compensation laws in force or being contemplated.

Compensation laws are, however, but an effort to mitigate a calamity that they can neither cure nor prevent. The greater virtue of accident reports is that they assist accident prevention. We have found in Minnesota that the accident reports aid the factory inspectors, first, by calling their attention to the danger points in the several industries; second, by showing them how the accidents most commonly occur on the several machines or in the several operations of the industry; and, third, by working out rules of prevention supplementary to the mechanical devices for prevention commonly ordered by the factory inspector.

This point may perhaps be made clearer by citing a few of the facts that the Minnesota statistical department has been able to call to the attention of the factory inspection department, and the method used to place the facts before them. Adopting a scheme not uncommon among private corporations, our bureau has instituted periodical conferences of the entire force. The first of these conferences was held last spring and the next one will probably take place during the Christmas holidays. At the conferences of last spring, which lasted two days, experienced factory inspectors, members of the statistical department, and the commissioner and his assistant laid before the members of the bureau information and suggestions upon the various matters coming within the inspectors' duties; each speaker dealing with the problems upon which he was especially expert. The entire bureau then discussed the various points raised until a definite policy was reached and adopted, the enforcement of which then became a duty of the several inspectors. Fully six hours of this conference was consumed by the statistical department in suggestions upon accident prevention, and the little bulletin on "Safety" that I have put in the hands of those present to-day embodies many of the specific suggestions made at that time. It will be followed by other similar bulletins, each applying to but a single industry, and by at least one more bulletin applying to the general industries of the state.

In addition to the suggestions contained in this bulletin the accident records have revealed such facts as the following. Approximately 10% of the industrial accidents in Minnesota during the statistical year 1910 were due to falls. Prominent among the causes of falls were the lack of strong railings on overhead platforms, stagings and gangways, lack of proper coverings on slippery floors, the use of ladders whose bottoms were not adapted to the floors upon which they were used, and the flimsy construction of scaffolds, platforms, and other types of industrial equipment. These facts were impressed upon the inspectors with instructions to give especial attention to them. Similarly, the records reveal the relative importance from the accident standpoint of the different kinds of machines in each industry—such as edgers, jointers and rip saws in saw mills—and the manner in which accidents occur on each, and enable the inspector to tell just where and how accidents are apt to occur.

It is very important that accident reports intended for prevention uses shall be as detailed as possible. Minnesota's experience has been that the causes of accidents are reported with every degree both of completeness and incompleteness, and that much attention must be given this point by the administrative authorities. It is often helpful to return the blanks for a more complete report, to write the firm a courteous letter requesting more complete reports in the future, or to send an inspector to the establishment to discuss the matter with the employer.

Much can also be accomplished along this line by encouraging employers to be as specific as possible in describing the machines or other material instrumental in causing the injury and the manner in which the accident occurred on it. A timely word of appreciation is often a valuable measure to this end.

Oftentimes the employers themselves, particularly in such industries as mining, lumbering, and contracting, have difficulty in getting complete information, and cannot give more than a brief summary of the facts, such as "a tree fell on him" or "a chunk struck him".

At other times, the facts are so complex that they could not be fully reported without photographs, drawings or long descriptions such as the employer could hardly be expected to send in. And in still other cases a feeling of hostility or distrust causes those reporting to state as little as they can and still comply with the law. These peculiarities of the problem make it necessary to supplement the employers' reports by special investigations. Every Minnesota factory inspector has orders to drop everything and hasten to the scene of any fatal or serious accident in his district as soon as he hears of it. For instance, when a shoe factory elevator in St. Paul dropped four stories one morning last winter, killing three girls and a man, four members of the department were on the scene in an hour and a half, even before the clothes of the victims had been removed, although elevators were not then under our jurisdiction. The inspectors are required to file careful reports of these investigations which are utilized for prevention information. In framing an accident law care should be taken that perfect freedom to make special investigations is given by that law or some other to the authorities charged with the enforcement of the report law.

The reports once received, the next essential is intelligent analysis. I once saw a statistician classify the "machine men" who operate stoking machines in gas plants, and who are but common laborers trained to a specific task, as "machinists" and tabulate their wages as such. The man who is going to tabulate accident reports with a view to searching out preventable accident causes must know the difference between a drill machine and a planer, a job press and a linotype, a swinging scaffold and a permanent staging. He must understand the problems of production that confront the manufacturer as well as the need of safety that pertains to the worker. He must be cognizant of the peculiarities of youth and age, of race and sex, of ignorance and training. He must be acquainted with the methods of statistical science and the humanitarianism of the social viewpoint. And he must be fair, impartial.

But even a complete enumeration of the accidents, with adequate descriptions and intelligent analysis of their causes does not complete our work if we want the full use of a state's accident records. The results of the study must be brought to the attention of the employer and the employe. We have found in Minnesota that there are at least four general ways in which this can be done. In the first place, it can be done by the state's factory inspectors. For instance, when we find that falls, contact with low horizontal shafting, exposed set screws, unboxed belts, chains, cables and gears, and unguarded or poorly guarded saws, are prolific causes of injury the factory inspector can order rails on all places from which persons might fall, require belts, chains, cables, and gears to be boxed, set screws removed or covered, and saws to be effectively guarded.

In the second place safety bulletins containing specific instructions for the guarding of dangerous places may be put into the hands of employers, insurance companies and state factory inspectors which will call their attention to the ascertained causes of injury and means of prevention. The first of a series of such bulletins has already been issued by the Minnesota Bureau of Labor. The Wisconsin Bureau of Labor has also published a valuable bulletin on the subject, copies of which are in the other room.

Safety placards, warnings, and suggestions posted in factories and work places form a third useful means of disseminating safety information, and safety exhibits, such as that presented by the Minnesota Bureau of Labor at the State Fair in 1910 and 1911, (photographs of which we have with us), which was visited and carefully examined by more than 5,000 people during the week, even though the fair attendance was only one-third of the normal attendance because of heavy rains, do much to awaken interest in safety and to call specific suggestions to the attention of "the man on the job". Many requests were received from manufacturers visiting the exhibit at the fair for the names of the manufacturers of various safety devices shown, and valuable comments upon the various devices were obtained from the employers and mechanics attending the exhibit. This exhibit is maintained permanently in the department's office in the state capitol, and is visited there by thousands of people annually, many of them employers.

The character of this gathering makes it inadvisable to go into more detail concerning the work being done in Minnesota, but before taking my seat I desire to say a word concerning inter-state action toward uniform accident reports. Two things, it seems to me, are necessary to make American state accident records what they should be: first, adequate records; and, second, uniform records. I do not consider accident records adequate which fail to show for every industry separately, the age, sex, experience, wages, nationality and occupation of each person disabled for more than two weeks, the actual task in which he was engaged at the time injured, the hour of the day at which the injury occurred, an exact description of the machine or process causing the injury, the nature of the injury and the period of disability.

Uniformity, both of data collected and of tabulation, is equally essential. At the present time Minnesota finds the accident reports of other states almost valueless for her work, either because they are inadequate in scope, incomplete in enumeration, or vary from our statistics in the mode of tabulation. An effort by our department to compile comparative accident statistics from other states was a complete failure.

To illustrate: A short time ago one of our factory inspectors found five girls under fourteen years of age at work in a Minneapolis laundry. Two of them, one twelve years of age and the other thirteen, were working upon mangles. The laws of Minnesota make sixteen the minimum age for employment upon these machines, which are defined in the law as "dangerous". The inspector at once swore out warrants against the manager of the laundry for employing these two children on a dangerous machine and he has been indicted by the grand jury, the offence being a crime and punishable by a heavy fine or a year in the penitentiary. The violation of the child labor law which obtained in the case of all five children, was passed by, for the present, lest the department should seem to be persecuting the particular firm.

The defense has demurred to the indictment upon the grounds that the mangle is not a dangerous machine and that a child below sixteen years of age is no more liable to injury than a child over sixteen years of age. The issue, you see, is squarely one of fact, and the enforcement of the law depends upon the evidence which can be adduced to prove that a mangle is dangerous and that children are more liable to injury than older persons. In the preparation of our case we have gone through the reports of every American labor bureau and every accident publication that has official authority, seeking evidence upon the two points. And in the whole mass of reports we did not get as much information as we should have obtained from each one of them.

Our accident records lack completeness, precision and detail. We must pause in our compilation of totals and averages and publish some definite and detailed information upon the exact causes of accidents in all our industries and in all our states, and upon a uniform basis.

THE ADVANTAGES OF STANDARD ACCIDENT SCHEDULES

Edson S. Lott
President, United States Casualty Company.

It seems to me that trying to prove that it is advantageous to have throughout the country a uniform system for reporting to responsible heads, accidents to workmen, is much like trying to prove that it is wet when it rains—if it rains hard enough. And because it all looks so easy, I may find it as hard to answer as I did the query of my little grandson, who asked,—"Grandfather, why is it wet when it rains?"

The lack of uniformity in the manner and method of reporting accidents, and the wide diversity of the information contained in the subject sought to be illuminated by statistics; and the statistics for the purpose of intelligently predicting the effect of changes in labor laws. Hardly any two state labor departments use similar blanks in asking for reports of accidents, and the method of tabulating accident statistics changes with state boundary lines. The result is that any general compilation of industrial accident figures available for public use is not possible. They have not sufficient points in common.

But beyond all this is the fact that investigators sometimes omit the collection of important details that would give another aspect to the subject sought to be illuminated by statistics; and the statistics themselves frequently vary with the varying notions of the persons who give the original data, if there be the least opportunity for a difference of opinion as to how questions should be answered. It has been said: "There are three kinds of lies,—white lies, black lies, and *statistics.*"

If all this be true, uniform schedules for reporting industrial accidents will not only prove highly advantageous, but intelligence in compiling statistics will work a revolution. We shall then get information really of value.

Speaking from the standpoint of an official of an insurance company writing employers' liability and workmen's compensation insurance the country over, I can testify that it would be most advantageous to such insurance companies to have all industrial accidents in all states reported in the same way and disclosing the same information. The statistics which, within a few years, could and would be tabulated from such a mine of information would be of great use to casualty insurance companies in deciding intelligently and fairly what effect new labor laws would have on the cost of employers' liability and workmen's compensation insurance. Inasmuch as the rejection or adoption of new labor laws by legislatures is apt to hinge on the burden to employers which such proposed laws may fairly be expected to entail, the state is certainly interested in anything which gives promise of foretelling what that burden is likely to be.

The premium rate for employers' liability and workmen's compensation insurance tells, more or less accurately, what that burden really is. Reliable statistics, gathered from a very large number of intelligent and comprehensive reports of industrial accidents, would enable the insurance companies to add materially to their present knowledge, and would bring their business that much nearer to an exact science. In that event, I am sure lawmakers could be made to see more clearly than at present the very great additional burden they place on the shoulders of employers, when they broaden the liability of employers as respects accidents to their employes—just, though I believe such burden to be. I believe that the state and the insurance company are both vitally interested in uniform accident schedules. I am of the opinion that the information which the state most needs is that which the insurance companies find most useful for themselves.

What casualty insurance companies themselves want to get from reports of accidents is:

1st. Data that will show what measures should be taken for the prevention of accidents.

2nd. Data that will show who is responsible for accidents.

3rd. Data that will enable the calculation of premiums for employers' liability and workmen's compensation insurance.

As respects accident prevention, casualty insurance companies should have, in connection with each accident reported:

(a) Description of the place where the accident occurred and of the tool or appliance causing the accident.

(b) Description of how the place where the accident occurred was lighted.

(c) Description of the accident itself.

(d) Statement of the cause of the accident.

(e) Statement whether guards were provided, and if provided, whether they were adequate.

(f) Statement whether guards were in use, and if not, whether they had been removed by the injured person.

(g) Age of injured person.

(h) Sex and nationality of injured person.

(i) Duties of injured person.

(j) Length of time injured person had worked with the tool or appliance causing the accident.

(k) Statement of the instructions, if any, that had been given the injured person regarding his work, and regarding the tool or appliances causing the accident.

(l) Statement as to whether the accident was due to want of ordinary care on the part of the injured person.

(m) Statement as to whether the injured person was under the influence of intoxicants or drugs at the time of the accident.

(n) Hour of day at which the accident occurred.

(o) Number of hours the injured person had been working on the day the accident occurred.

(p) Statement as to whether "pushers" or "shovers" were employed to speed up workmen, including the injured person.

(q) Statement as to whether and how the accident could have been avoided.

As respects responsibility for accidents, we should have data that will enable the classification of accidents under one of the following heads:

(a) Inevitable risk.
(b) Carelessness or want of skill.
(c) Want of guards.
(d) Non-use of guards.
(e) Improper factory arrangements.
(f) Insufficient lighting.
(g) Want of proper instruction.
(h) Disobedience of rules.
(i) Unfit clothing.
(j) Intoxication or under influence of drugs.

(k) Fault of other (third) persons.

(l) Fault of employer and workman jointly.

These data are lacking as respects American industries. If we had them we should know pretty well what per cent of injured workmen could obtain "damages" from their employers under the utmost possible extension of the employers' liability system. The experience of casualty insurance companies shows that of all workmen injured during employment (in this country) only one in eight obtained "damages" from his employer; and this takes into account only those injuries of sufficient importance to have been reported to the insurance companies. Of course these damages were obtained on the theory that the employers were wholly at fault for the injuries.

German statistics seem to show that under the utmost extension of the employers' liability system, apart from the system which provides "compensation" for practically all accidents, irrespective of who is at fault, one injured workman in four can obtain damages; that is, the employer is at fault as respects 25 per cent of the accidents.

As respects calculation of costs (insurance premiums) under workmen's compensation acts, we should have the following data:

(a) The total number of workmen exposed in the given industry during a stated period of time.

(b) The total wages of these workmen during the stated period of time.

(c) The number of deaths of workmen, and the number of the dead that had dependents (with statement of number of dependents in each case, whether they are citizens of the United States or of Canada, and their relationship to the deceased), and the number of dead that had no dependents during the stated period.

(d) The number of workmen receiving permanent disabilities, the nature of these disabilities, and the ages of the persons contracting them within the stated period of time.

(e) The number of workmen temporarily disabled and the length of time each was disabled from work within the stated period of time.

(f) The weekly wages of the killed and injured workmen.

It is amazing what volumes of data regarding the number of accidents and their character have been collected without any attempt being made to ascertain and state the exposure, just the thing the insurance actuary wants to know in making premium rates. The total number of accidents happening in the United States during any given period of time has but little to do with the making of a liability insurance rate for woolen mills, for an instance.

Another advantage of uniform accident schedules to casualty insurance companies is that it will enable the companies more accurately to determine what differences, if any, in respect to physical hazards exist among the states. We have long known that there were differences among the states as respects the costs to employers for liability imposed by law for accidental injuries to their workmen. Calling this cost "1" in the states where it is the minimum, the table of relative costs for a number of the important states has been as follows:

Florida	1.
Maryland	1.
Pennsylvania	1.
Massachusetts	1.66
New York	2.
Ohio	2.
Illinois	2.22
Indiana	2.22
Missouri	2.22
Kentucky	3.33
Tennessee	3.33
Texas	3.33

To what extent these differences have been due to differences in the physical hazard,—defining "physical hazard" as exposure to danger, methods of doing work, kind of machinery used, precautions taken against the occurence of accidents, and character and intelligence of employes,—and to what extent they have been due to differences in the legal hazard,—defining "legal hazard" as the laws and judicial decisions and the attitude of the community, courts, and juries toward the question of the relation between master and man,—we have not known and do not now know. When these things are ascertained they will be of equal benefit to the state and the insurance company.

There are two things to bear in mind. First, the employer is usually a busy man; he is often averse to "state interferences" when he thinks he is being interfered with; he just naturally dislikes legal "red tape"; he is not infrequently out of sympathy with the object sought; if you ask him for too many details, some questions may be ignored or erroneously answered. Second, care should be taken not to burden statistical departments of the state labor bureaus with unnecessary work or with the tabulation of figures of relatively small value compared with the time required in assembling them, for states are notoriously niggardly in appropriating money for the compilation of statistics for future use.

Various states are embarking on the unknown sea of workmen's "compensation", as distinguished from employers' liability, under the notion that a workmen's compensation system will cost the employer little or no more than an employers' liability system. Casualty insurance companies know better, but their small voice has been unheard or unheeded. When statistics such as I have outlined are available for all states they will be of very great aid to lawmakers in drafting laws for the *prevention* of accidents, of infinitely greater value to the world at large than any kind of insurance against accidents—and they will, I am confident, sustain my prediction of the high cost to employers of workmen's compensation laws.

Do not misunderstand me, I feel strongly that justice and humanity require us to substitute a workmen's compensation system for the existing employers' liability system, but I think we should make the change with no illusions as to the cost to employers of labor.

To those states which contemplate entering into the perplexing, bewildering, complicating, entangling, confusing, puzzling, harassing, ever changing and shifting business of liability insurance, in an honest endeavor to provide such insurance at a lower cost than experienced private insurance companies can and do provide it, I respectfully suggest that they first gather the necessary data on which to base their estimate of cost to employers, and that then they employ persons properly endowed to make proper use of such data—if those having the matter in charge have sufficient knowledge of the subject to know such persons when they see them, and political influence will permit them to exercise their judgment.

To those citizens who are trying to make personal political capital out of loud talk about state insurance, and to those who honestly believe that "the State" and the everchanging officeholders who run it can do what mortal man finds impossible, I have nothing to say—and wouldn't be listened to, if I had.

A PLAN FOR ARRIVING AT UNIFORM ACCIDENT REPORTS

Leonard W. Hatch
Chief Statistician, New York Department of Labor.

It seems quite clear that as a result of the present widespread movement for reform and progress in dealing with the problem of industrial accidents in the United States, we are on the eve of a great extension of work in connection with government statistics of accidents. This is because already the recent investigations, both of public and private agencies, concerning the problems of compensation and prevention have brought forcefully to light the very inadequate statistics of accidents thus far available in this country, especially as compared with foreign statistics, while at the same time such investigations, which have been quite generally notable for the degree of scientific spirit animating them, have emphasized the necessity for comprehensive and accurate knowledge of the facts as the indispensable condition of wise progress. And even more with respect to the future, it is evident that the success of the new principles, or new methods, now being established, both as regards compensation and prevention, will in no small degree depend upon the measure in which accident statistics are developed and scientifically applied, an almost self-evident proposition, and one which has received practical recognition in a number of the states prominent in the present progressive movement, which in connection with new legislation for workmen's compensation or accident prevention, have made new or additional provision for accident statistics.

Now this development, must, perforce, be a development of acciden statistics in the several states since prevention and compensation laws lie principally within the sphere of state legislation, and this brings us at once to the topic for this morning, inter-state uniformity in accident statistics.

So far as the present situation on this question is concerned, the general fact is that uniformity in American accident statistics is chiefly conspicuous for its absence. This is true of the laws providing for reporting of accidents, of the forms and methods used for collecting reports, and of the presentation of the returns secured. This fact is sufficiently obvious with respect to the laws in the tabular summary of accident reporting laws in the June number of the American Labor Legislation Review; it has recently been verified by the writer with respect to report blanks used under such laws by a comparison of the schedules used in the several states; while anyone may easily verify it with respect to presentation of the statistics, by a comparison of the classifications and form of tables to be found in the reports of factory and mine inspectors, or of bureaus of labor statistics.

That this lack of uniformity is deplorable requires no argument. It simply means that scientific comparison of the operation of laws or administrative methods in different states, as to prevention or compensation, is largely precluded, and that the cumulative value of combined data for different states is lost. To just the extent that this existing lack of uniformity is to be deplored, therefore, does it behoove those interested to consider the question of the possibility and means of inaugurating uniformity, just at this time when we are entering upon a great expansion of work in this most important field.

Is uniformity possible? And if so, what is the road to it? Uniformity must be conceded at once to be theoretically possible, the moment it is considered that the fundamental aspects of industrial accidents are the same in all states and the necessary facts for the statistical determination of those aspects are the same. For example, prevention is a universal problem, and every state which is dealing with that problem (and what state ought not to deal with it?) needs, for formulating wise laws to safeguard employment and for the most efficient enforcement thereof, comprehensive and accurate information as to the causes of accidents. Now the fundamental causes of accidents in the same industries are the same in different states. Accidents happen on protruding set screws, or on uncovered gears, or because of carelessness of employer or employe, in one state just as they do in another. In a word, the phenomena to be studied are essentially the same in all states, and each needs the same kind of information about them.

Since, then, there is no scientific basis for the existing lack of uniformity, the inference must be, that it has come about through varying understanding or care concerning the fundamental facts about accidents and their significance by legislators and administrators acting independently at different times and in different states. In other words, that it is itself chiefly an "accident," and mainly an evidence of the crudity of American work in this field up to the present time. And this is the only inference, likewise, to which any comparison of the actual statistics of different states leads.

If this diagnosis be correct the problem of securing uniformity appears to be first of all that of determining and bringing to the attention of the different state agencies concerned the fundamental facts universally needed concerning accidents. Uniformity as to methods of securing such data, and in methods of presenting them, would also have to be considered, and a determination of the best methods for both of these might be a natural part of any program for complete uniformity. But these latter are not equally important with the first in the problem of uniformity. The last obviously, is secondary to the first. Only after similar facts have been secured, can uniformity in methods of presenting them be discussed and the latter uniformity is quite likely to follow the first in any case. The second, again, is not indispensable, for it is quite possible for different states to procure uniform data by different methods. While, therefore, the problem of uniformity must ultimately involve consideration of all three of the above items, the one of the first importance, as the foundation of all, is the determination of what facts about each accident need to be known. Now, in the technique of statistical work, this is done by the schedule of questions in the blank to be used for reports of accidents. The formulation of a uniform schedule for accident reports, therefore, appears both scientifically and practically, as the first and most important step toward uniform accident statistics.

The next question to consider in a practical program looking toward uniformity is, who shall formulate such a standard schedule? Since the aim in this matter is not merely to secure mechanical uniformity but rather to arrive at a scientific schedule which may serve as a standard also, and since it is clear that its adoption in different states cannot be forced but must be secured through comprehension of its correctness and a spirit of coöperation, it would seem quite clear that the widest coöperation, in the very process of formulation, of all those interested in the subject is highly desirable, both for the purpose of arriving at the soundest judgment in the formulation of the schedule and as best paving the way for its adoption. Some kind of conference, therefore, of all those interested or who can contribute to it seems to be the proper agency for the formulation of a standard schedule.

But conferences do not grow spontaneously. As least, someone must start them. For this function it is submitted that no more appropriate or promising agency can be found at this time than the Association for Labor Legislation. The Association is eminently appropriate for this service because it has set up as its ideal not any kind of labor legislation, but above all scientific labor legislation, which is only another expression for legislation based on comprehensive and accurate knowledge of the facts, and this is certainly, so far as accidents are concerned, in large measure a matter of statistics; appropriate also because another fundamental aim of the Association is that of raising the standard of administration of labor laws, and this likewise by insisting on scientific administration, that is, the development of administrative methods in the light of accurate knowledge of the facts dealt with and the results of experience, and this likewise, in respect of accidents, is preëminently a matter of wise use of accident reports and statistics. In a word, just so far as accident statistics are the necessary basis of scientific legislation and administration of prevention or compensation laws, to that extent is it eminently appropriate that this Association should concern itself with the development of such statistics.

And the Association appears on the whole the most promising agency for the purpose in view because of the catholicity of its membership in accordance with its broad policy of bringing together all elements interested in labor laws. So that here is the natural medium for bringing together both the elements which must combine for the successful accomplishment of the proposed end, that is the scientific and practical. Or to put it in the concrete, no other agency appears to offer, by the very evidence of its existing membership, anything like equal promise of success toward securing the coöperation of economists and statisticians, on the one hand, and of commissioners of labor and factory inspectors, on the other, the knowledge and experience of as many of whom as possible is desirable for the end in view.

So much by way of generalities which, if the statements made be correct, reveal, as the groundwork of a plan for uniform accident statistics, the formulation of a uniform standard schedule by coöperation of those having knowledge and experience in such work under the auspices of this Association. It may possibly appear somewhat superfluous to have taken the time to review the fundamental reasons for such a move on the part of the Association, especially in view of the fact that, as the program for this afternoon shows, the Association has already tentatively committed itself to the project by providing for a conference to take up the actual drafting of a schedule. But it has seemed to the writer worth while to go over the general ground in this connection because he has long been impressed with the great need of some coördinating agency, not only in the field of accident statistics but also in other branches of labor statistics as well as in the field of administration of labor laws, which could coördinate not only the practical experience of administrators in different states but bring into such coördination the scientific knowledge and special study of others also, so that standardization as well as coördination may be secured, for which general function the Association seems now to be by far the most appropriate and promising agency. Much of what has been said above, therefore, in this particular connection, it is believed will bear much more general application than to the field of accident statistics alone.

Turning now to the wholly concrete side of the plan, by way of preliminary to what is hoped will be the very practical discussions of this afternoon's conference, it is in order to consider one or two apparently necessary or desirable limitations upon what can be attempted immediately:

It will be observed that what has been said above has been said with reference to inter-state uniformity in government accident statistics only. As a matter of fact, the casualty insurance companies handling employers' liability insurance have been, and are still, the collectors of the most extensive industrial accident statistics in this country. This fact is significant because such companies require from every insured employer a report of every accident to an employe. The result is that where a state also requires a report of the accident great numbers of employers are required to make two reports of each accident. If now a uniform schedule could be devised (the schedules used by insurance companies and state officers are at present far from uniform) which would serve the purposes of both the state and insurance companies, at least as far as they undertake to cover the same ground, it will easily be seen that the employers' duty of reporting would be at once considerably simplified, a thing in itself decidedly worth considering from his point of view, while it is also to be considered that such uniformity would presumably aid in some degree toward more complete and accurate reporting. There is another and newer aspect of this part of the problem which is to be noted. Heretofore, the accident records of the insurance companies, extensive and valuable as they are, have not been available to any considerable extent for public information. This has been entirely natural, of course, since they have constituted a valuable private asset of each company's business acquired by way of bargain and sale in a private business transaction. But it has recently been seriously considered in several states whether the insurance companies should not be required to make some return to the state of accidents reported to them, and one state (Wisconsin, in her new reporting law) already requires regular reports of cases by insurance companies. Without stopping to discuss the advantages or justification of such a requirement, it may be noted that an extension of it to other states seems more than possible, as the social significance of industrial accidents is more and more recognized. At any rate, so far as it has been or may be adopted, it brings up forcibly the question of uniformity between the schedules of the state and insurance companies. For even though thus far the proposition for reports from insurance companies has been almost entirely confined to the idea of requiring little more than lists of cases for purposes of checking up the completeness of the state's returns from employers, it is difficult to see why, so far as they are requiring the same information, such reporting, where established, is not likely to be developed into complete reporting through the insurance companies so far as insured employers are concerned. One other class of collectors of accident statistics might also be enumerated, namely those employers, usually large corporations or firms, who without insurance, maintain their own claim or safety department. The number of such is increasing, and particularly the number of such who are under-taking to accumulate and study their own accident statistics, is increasing (be it noted as one of the most hopeful signs of the times in this field).

Now the mutual advantage and economy to each one in this triangle of interests involved—the state, insurance companies and employers—considering only the mechanical side of the matter in the duplication of reports, is obvious; and an ideal program for uniformity might aim to envolve a standard schedule which would serve the purposes of all three interests. But considering the widely different points of view of these three parties as compared with the one social point of view of all the states, and the increased number of actual variations in existing schedules which would have to be handled in such a program (the schedules of insurance companies and employers vary among themselves, though less so in the case of insurance companies than the state schedules), and considering especially that the primary concern of this Association is standards for state legislation and administration, it seems altogether wise to limit the immediate practical program to uniformity in state schedules, which has accordingly been the point of view in this paper throughout. This limitation will certainly bring our proposition much more nearly within the range of practicability, and will certainly leave enough of a problem to work out, and an important enough goal to attain, for the immediate future at least.

A second question of general limitation has to do with the subject matter of the schedule. Shall it be attempted to draft a schedule which shall include all the possible items which it might be desirable to have as a basis for the most highly developed statistics of accidents, in a word, to draft an ideal schedule for all purposes and to cover every phase of accidents from the statistical point of view, or shall it be limited to something else? This question of how much ought to go into the schedule is obviously one on which there is room for much difference of opinion and which ought properly to be settled only after wide comparison of ideas, and can be settled finally only by a discussion of each individual topic. In fact, this question brings us up to the proper point for beginning the conference announced for this afternoon. But one general consideration is here suggested which ought to be kept in mind with reference to this question. As intimated in what has previously been said, it is to be hoped that the proposed standard schedule may not only be a means to uniformity in states already collecting accident statistics, but that by making a more or less authoritative schedule easily accessible to the others it may help to stimulate these to take up such work in the most useful fashion. The importance of this consideration will be easily recognized when it is noted that only fourteen or fifteen states now have any accident reporting laws, so that the field for pioneer work is large. For this particular purpose it would seem to be desirable on general principles to have an elementary rather than a highly developed schedule, one limited to the fundamental topics only, rather than to attempt to cover every possible phase of an accident for statistical purposes. Without stopping to specify all the reasons for this, it may just be noted in passing that one of them is the hard practical difficulty in most states in taking up work of this kind, of securing resources for more than elementary work at the outset.

Another proposition is here offered as a general guide when practical discussion of what points shall or shall not go into a standard schedule shall be taken up. Such discussion will of course immediately necessitate consideration of what purposes the statistics are to serve and which of these are fundamental and which secondary. Two considerations on this point are submitted. The first, which it is believed can scarcely be debatable, is that prevention is everywhere the most important end to be served by accident statistics. The second is that after prevention comes compensation as the next most important phase of the accident problem to be served by statistical study; and further, since it now seems safe to assume that the justice and social wisdom of the compensation principle is at last practically established in this country, and as the actual progress already made in its adoption seems to make it clear that its general establishment is only a question of time, the need now, and still less for the future is not for statistics bearing on the advisability of adopting the compensation principle, but rather statistics bearing on the cost of compensation.

The above considerations as to the scope of the standard schedule, if the writer's view of them be correct, lead to the general conclusion that it should be designed for state use, and that it should be confined to those facts which are of fundamental significance with reference to prevention of accidents and to cost of compensation.

This brings us to the point of taking up the individual facts, and the necessary inquiries concerning them which should go into a standard schedule as proposed. This would certainly seem to be the point where individual judgment may well be withheld pending the work of a conference as scheduled for this afternoon. Instead, therefore, of proceeding to details according to the writer's view of them, I have prepared from the existing schedules of all but one of the fourteen states having accident reporting laws, a summary of all the different items of inquiry falling within the scope of the proposed schedule as outlined above, which (together with so much of this paper as it may seem worth while to discuss) may serve as a starting point and outline for the conference discussion.

One word more, suggested by a little further look ahead than has been a part of any plan already formulated. The writer is well enough aware of the practical difficulties in the way of coöperative effort in connection with this sort of thing, not to pin too much hope on the possibilities of a single conference. Simply by way of suggestion of further possibilities, therefore, the fact may be noted that nearly all fruitful effort in other branches of statistics toward uniformity or standardization has been made by some form of more or less permanent committee. Some such permanent committee on uniformity and standardization of accident statistics in this country may, therefore, very well be the next step to be considered, should the general end appear to be important enough to warrant such a further move by this Association.

GENERAL DISCUSSION

Thomas P. Kearns, *Chief Inspector of Workshops and Factories, Columbus, Ohio:* I assure you that it is a pleasure for me to be present at this Conference today, and to have the opportunity to hear the excellent papers which have been read by these gentlemen, and to listen to the very intelligent discussion on this very important subject. It is particularly interesting to me at this time, as in the past I have taken a great deal of interest in the matter of reporting of accidents and of accident statistics.

As Chief Inspector of Workshops and Factories in Ohio, it is my duty to collect these statistics, and I had felt for some time that our system was not quite complete nor our laws adequate for gathering and compiling the necessary information to make them of value; the reporting of accidents had been a mere matter of form in a way. No very satisfactory or complete information being secured through these reports, I had a bill drawn and presented to the last legislature, which was passed, requiring the report to contain additional and more complete information, and providing that accidents causing a loss of two or more days' time be reported to the department, containing the name, address and nature of the business in which the manufacturer is engaged, and the place where the accident occurred; the name, address, sex, age and kind of employment of the person killed or injured and whether married or single; the time of day he began work on the day of the accident; time of day when the accident occurred and date; at what employed when killed or injured; whether familiar with work or machinery at which engaged; whether the machinery was in good order and guarded—if not guarded, the reasons for not guarding; description of manner in which the person was killed or injured; and the nature of the injury; the number of persons deprived of support in consequence of the same; and a subsequent or final report containing the total amount of time and wages lost, and the total amount of compensation paid.

The department has formulated new blanks in accordance with the new provisions of the law, has had a supply printed, and the same have been distributed throughout the state for use of the manufacturers in reporting these accidents. A few of these copies I have with me today. As soon as our forms and system of recording and compiling the reports of these accidents can be changed in accordance with the new blank, our statistics will give a great deal more satisfactory information, and be considerably more reliable and valuable to those interested.

We also had another object in view in changing this system of reporting accidents. This is, to secure the report of every accident as promptly as possible, with the necessary information in relation to the cause and nature of the accident, so that we might refer the matter to the men in the field whenever possible, and have an immediate investigation made with a view to preventing a repetition of the accident, since prevention of accidents is our principal aim. This cannot be done in every instance however, as the force is not adequate to keep in as close touch with the work as we should like; some of the men in the department have large territories to cover, in some cases as high as nine counties. You will therefore see that it would be impossible for that inspector to investigate every accident as soon as it occurred, as it would very seriously interfere with the other part of his work, taking as it would a great amount of time. We expect however, to carry out this plan as far as possible.

I am very much impressed with the idea of the different states, securing a uniform report of accidents, as I think it would prove both valuable and helpful to us all in this work, and I wish to assure you that I shall be pleased to lend any assistance in my power to bring about a uniform system of reporting in the various states. While it may not be absolutely necessary, in successfully dealing with this problem, it is at least essential and advisable, and I shall be pleased to lend my efforts toward that end.

DAVID ROSS, *Secretary, Illinois Commissioners of Labor, Springfield, Illinois:* I wish to call attention to the multiplicity of laws in Illinois requiring reports of accidents and the resulting duplication and confusion, and to the number of fatalities in the more hazardous occupations compared with the number of men employed and the volume of work performed. Notwithstanding the installation of numerous safety appliances particularly in mining and transportation the ratio of fatal and non-fatal accidents is more than maintained.

Miles M. Dawson, *Consulting Actuary and Attorney, New York City:* Undoubtedly it is most important that there be a good system of uniform reporting, but about how likely is it that we shall attain this under any of the systems of workmen's compensation, or even of state insurance, so far introduced? Where there is compulsory state insurance as in the state of Washington, there can, of course, be at least uniform reporting for that state, which has its advantages, and if the Ohio law turns out to be virtually compulsory, perhaps we may have something equally good from that state. In Massachusetts, however, with state insurance, in competition with private companies, how are we to command the statistics of these private companies, and in other states where the insurance of these accidents is a hotch-potch how can we possibly expect such a result?

Then, even if in individual states it were secured, how is it possible that the authorities in fifty different states will agree upon precisely the same form of reporting, and having so agreed, will stay agreed, which is even more difficult, in view of the changes in the personnel of the officials in charge? And even if the exceedingly improbable were achieved, that they were willing to stay agreed, how is it possible to assure that fifty different legislatures would permit them to do so, especially in case here and there an influential employer complained, and made a point of it, in respect to his support of his own political party?

At the present time there is a great dearth of information concerning the cost of these accidents, mentioned not too forcibly by those who have addressed you today. Even the employers' liability insurance companies feel the want of sufficient data keenly, and would gladly have more of it. But I have not heard that in this country or in any other country, they have willingly made public, for the general use of all interested, the information which they do possess; nor is it to be expected of them.

From this standpoint, as from all others, it seems perfectly clear that nothing effective and valuable is to be expected unless we introduce a system of nation-wide insurance, in which case there will necessarily be uniformity. There would in such case be central supervision, which if it changed in personnel, would change for the whole country and not for a part of it. All of the data would be available for all who are interested; and thereby the causes of excessive loss of human life and the maiming of human beings would be bared to the light, which is really the most potent influence that can be brought to bear to remedy them.

Lucian W. Chaney, *Expert, United States Bureau of Labor, Washington, D. C.:* The Federal Bureau which I have the honor to represent here has a most vital interest in the subject of uniform reports. When four years ago I began a study of the relation of women to dangerous machinery, the results of which have been recently distributed to some members of this conference, I went to many of the state bureaus hoping for assistance. I found that a great mass of excellent work had been done but so absolutely incomparable from state to state that any comprehensive view was utterly impossible. I was obliged to gather data from establishment to establishment.

It is more than probable that such accumulations will continue to be necessary, but both as check and supplement we ought to be able to appeal to the state organizations with an assurance that the same guiding principles have been applied throughout.

Our interest is particularly keen just at this time when the first national study of accidents in the iron and steel industry is nearing the point of publication. I hope in this forth-coming report to do for this industry, and for a brief period, something comparable with what the German Imperial Insurance Office has been doing for all German industry for a long series of years. Indeed, this report should give some insight into a problem in which the Germans do not help us, namely, something definite regarding the significance of the shorter periods of disability. As you are aware the Germans deal with disabilities up to thirteen weeks through their sickness societies and the Imperial office makes no account of them. There are in fact no published statistics regarding the shorter periods except those of Russia. As a result of the experience of this study the Federal Bureau has determined to prosecute for the next five years a nation-wide study of accidents. We shall complete a survey of the year 1910 in certain lines, then we shall follow, for a series of selected establishments, a year to year history of the situation, and then for 1915 attempt again a more complete treatment.

This is a large task and one to which the state bureau may make valuable contributions while at the same time improving their local service by adopting some uniform system. It is greatly to be hoped that the great insurance companies may ultimately be drawn into this movement since the American organizations now have the greatest body of detailed information regarding cases of accident to be found in the world. These accumulations have served the companies well, I have no doubt, but they may be made of a much wider service if properly studied and presented.

In regard to Mr. Lescohier's desire for information regarding the question of hazard to young workers I may ask him to refer to the section on Cotton Mill Accidents in Vol. I of the Woman and Child Labor Report. In preparing that section I ransacked the literature of the subject without finding anything more than inferences regarding the relative hazard of young and adult workers.

FLORENCE KELLY, *Secretary, National Consumers' League, New York City:* I wish to suggest that in the uniform schedule there should be a question which will bring out clearly whether the injury befell at night, and if so, at what hour of the night. We know, in a general way, that there is a vast amount of nightwork, and that an increasing share in it is performed by women and children. But we have very little detailed information about this from any part of the country. The sidelight obtainable by the requirement of complete records of the time at which injuries befell, will be an incidental advantage derivable from these schedules.

I speak of injuries not accidents, because I think the public mind should be accustomed to distinguishing between injuries, vast numbers of which are preventable and should never be called accidents, and true accidents, which we have not yet learned to prevent.

CHARLES P. NEILL, *Commissioner, United States Bureau of Labor,* wished to emphasize the part played by fatigue as a cause of accidents. In addition to getting the number of hours per day that an employe has worked, he thought we should find out, first, how many hours after beginning work did the accident occur? second, how many days had the employe worked on that particular machine? The number of accidents which occur during the first two or three days that a workman operates a machine is startling. Without uniformity statistics produce a confusion that is vicious. Dr. Neill said he had actually met with cases where officials did not know the basis used in getting percentages. It is a crime againt civilization to give out such figures as we have at present and it certainly is a great injustice to the taxpayer, as well.

At the close of the session, the following resolution was presented by Don D. Lescohier of the Minnesota State Bureau of Labor:

"RESOLVED, That the president of this Association be requested to appoint a committee of five persons to frame a uniform system of reporting industrial accidents and occupational diseases and tabulating accident statistics, of which committee the secretary of this Association shall be a member and act as secretary; this committee to report to the Association at its annual meeting at Washington, D. C., in December of this year."

The resolution was unanimously adopted and Prof. Seager, as President of the American Association for Labor Legislation, appointed the following committee:

Leonard W. Hatch, New York Dept. of Labor, *Chairman.*
Lucian W. Chaney, United States Bureau of Labor.
John R. Commons, Industrial Commission of Wisconsin.
Don D. Lescohier, Minnesota State Bureau of Labor.
John B. Andrews, American Association for Labor Legislation, *Secretary.*

The committee met in the afternoon at a round table conference with several experts, and a tentative draft for a uniform accident schedule was adopted. It was decided to hold further meetings with experts on industrial accident and disease reporting and prevention, and to submit more complete schedules at a second general conference to be held in connection with the annual meeting of the Association for Labor Legislation in Washington Dec. 27-30, 1911.

A round table conference on the Administration of Workmen's Compensation Acts was held in the afternoon. Mr. C. H. Crownhart of the Wisconsin Industrial Commission was chairman and Mr. Amos T. Saunders of the Massachusetts Commission on Compensation for Industrial Accidents, led the discussion. Among those present were Mr. George A. Lee, chairman of the Washington Industrial Insurance Commission; Mr. Will J. French of the California Accident Board; Miss Lucile Eaves of the University of Nebraska; Mr. Miles M. Dawson of New York City; Mr. Gerald W. Brown of the Ottawa Department of Labor, Canada, and Mr. Paul Watrous, Secretary, Wisconsin Industrial Commission.